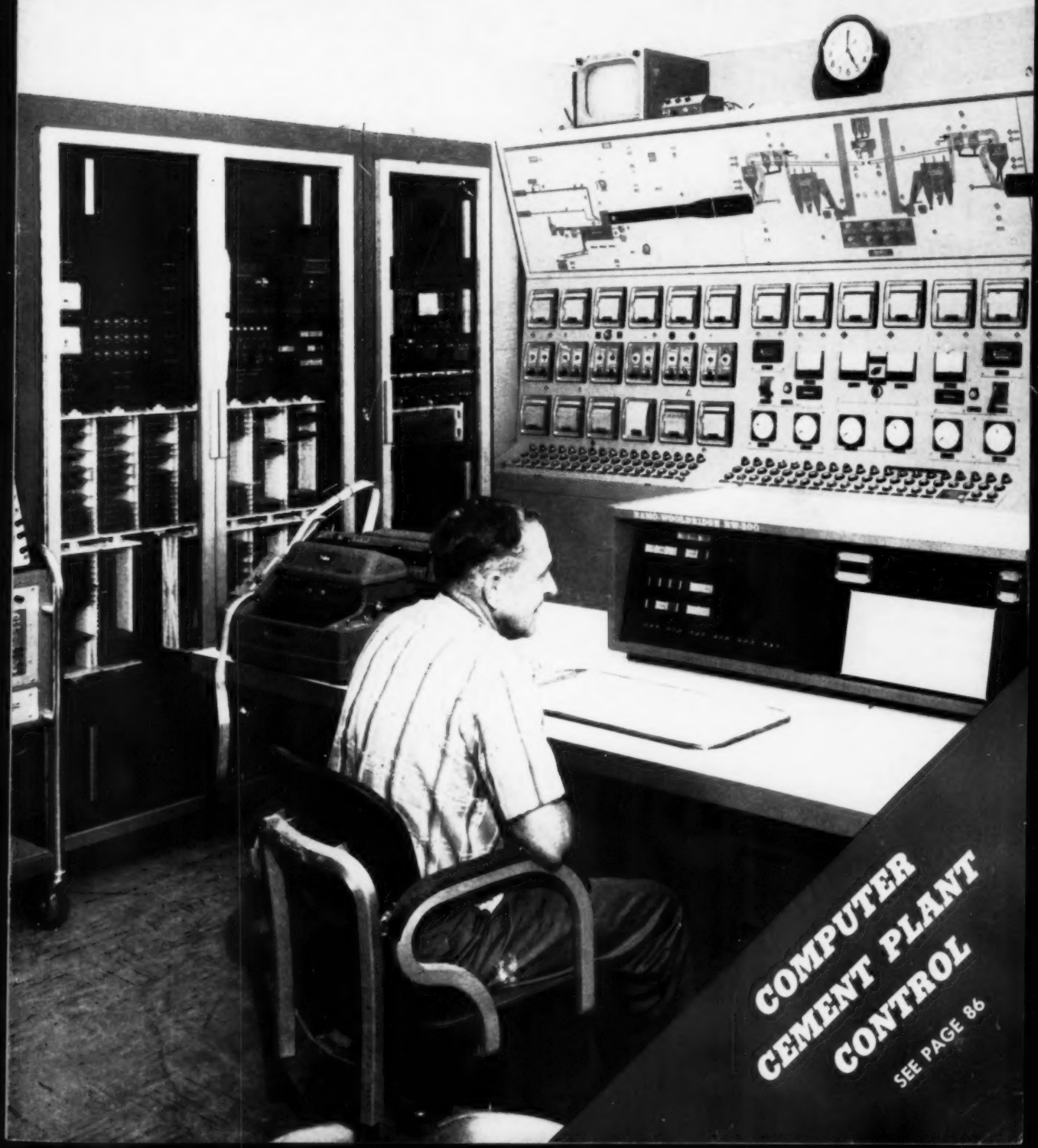
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

march 1960



COMPUTER CEMENT PLANT CONTROL

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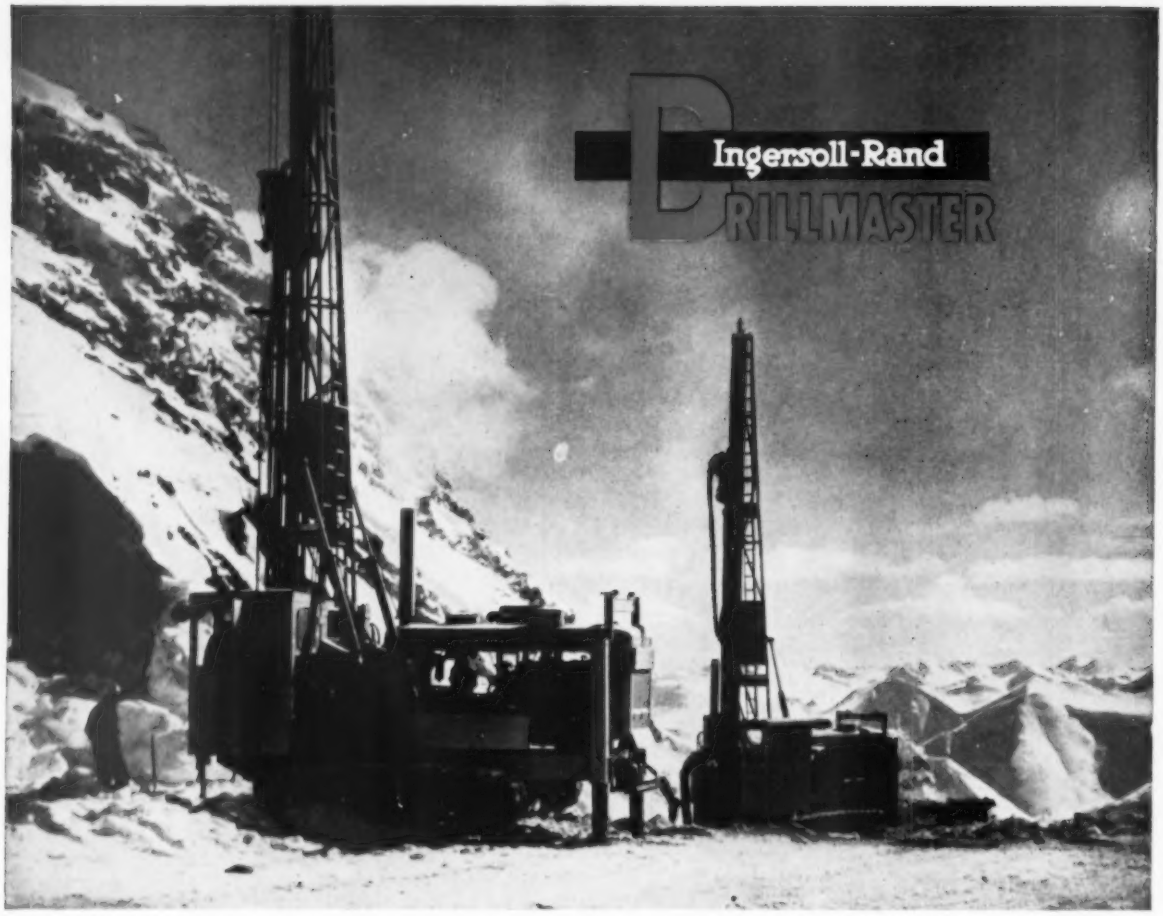


I-R Drillmasters average 100 ft. per shift, 24 hours a day, in

MILE-HIGH ASBESTOS QUARRY

At an elevation of 6200 feet on a spur of McDame Mountain in British Columbia, the Cassiar Asbestos Corp. is mining 2500 tons of ore and removing an additional 3000 to 5000 tons of overburden each day. Here, in sub-zero temperatures, crews work around the clock in three shifts, 7 days a week during the so-called "summer".

To maintain high production during the mining season, two I-R DM-3 Drillmasters with Downhole Drills and 6½" Carset bits are in continuous use, averaging 100 feet per drill shift. Holes are put down 33', spaced 16½' apart with 15' burden, resulting in 14.5 tons of broken rock per foot drilled, using 5x16" Dynamex cartridges, as well as prilled ammonium nitrate and fuel oil.

In this rugged, snow-covered terrain, the excellent traction and maneuverability of the crawler-mounted Drillmaster is a big asset, and its self-contained Ingersoll-Rand Gyro-Flo compressor provides maximum drilling pressure without air line losses from long lengths of piping or hose.

In warm weather or cold, at high altitudes or sea level, a Drillmaster is your best assurance of top drilling efficiency at rock-bottom cost. Ask your Ingersoll-Rand engineer for further information on its features and performance.

Ingersoll-Rand
11 Broadway, New York 4, N.Y. GAS

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

Enter Cover 2 on card, page 173

You never had 'em so tough!

HARD ROCK LUG XTRA TRED

Here it is! From Goodyear's advanced technology and processes—

HARD ROCK LUG XTRA TRED—the mine and quarry tire that's built with extra tread to take it where the going's tough!

It's made with 3-T Nylon Cord—triple-tempered by Tension, Temperature and Time—that makes *the world's toughest tire bodies.*

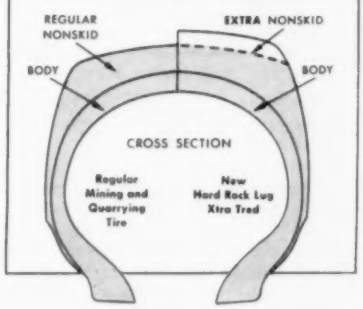
It has specially compounded rubber that embodies remarkable super-toughening agents for far greater chip-, wear- and penetration-resistance—that produces *the world's toughest treads.*

And, with its thicker nonskid tread depth (as much as 71% thicker) for harder-biting, longer-wearing lugs, you take out *more pay loads in less time and at lower cost*—with fewer maintenance headaches, too!

Ask your Goodyear dealer about Hard Rock Lug Xtra Treds, *now.*

Goodyear, Truck Tire Department, Akron 16, Ohio.

MORE AND TOUGHER RUBBER IN THE RIGHT PLACES!



THE WORLD'S TOUGHEST TRUCK TIRES BY

GOODYEAR

Xtra Tred—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Enter 1 on card, page 173

PIT AND QUARRY, March, 1960. Vol. 52, No. 9. Published monthly by Pit and Quarry Publications, Inc., 431 South Dearborn St., Chicago 5, Ill. Subscription price $3 for 1 year in the U.S., possessions and Canada. Central and South America $10 for 1 year, elsewhere $15. Single Copy $.50 except $1 for January, May and July. Entered as second class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3, 1879. *Postmaster: Please send notices on Form 3578 and copies returned under label Form 3579 to 431 South Dearborn Street, Chicago 5, Ill.*

Fuller . . . headquarters for

Feeders

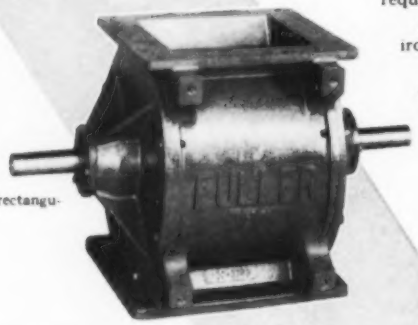
Fuller Roll Feeder for volumetric accuracy, without pulsations.

When your problem is one of feeding dry, pulverized or granular materials, why not come direct to headquarters—FULLER—designers and builders of various feeders for many uses. We have built thousands of feeders for the process industry, year in and year out, for over a quarter of a century. Many have been of special types to meet individual requirements.

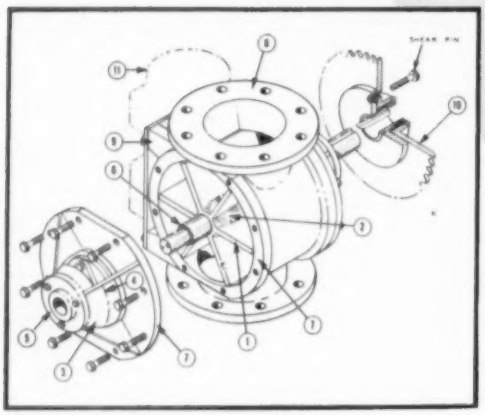
Standard feeders are built of cast iron or combinations of iron and steel. When required, they can be built of special alloys.

The Fuller Roll Feeder is especially adaptable to handling of dry, pulverized materials with volumetric accuracy, without pulsations. Vane type feeders are built for use where extreme volumetric accuracy is not particularly essential. They are built with stuffing boxes and ball bearings, for vacuum, low pressure, and general purpose uses, with circular or rectangular flanges.

For complete information write for Bulletin F-5.



Vane type feeder with rectangular flanges.



Vane type feeder with circular flanges. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.

Description of drawing above:

1. Six vanes. Two vanes seal between inlet and outlet.
2. Tapered rotor hub. Reduces friction from trapped material between rotor and headplates.
3. Integral-cast bearing brackets insure concentric bearing centers with male-female joint between headplate and feeder body.
4. Bearing brackets on sides of packing glands allow free drop of packing gland leakage; prevents material from entering bearings.
5. Integral-shielded ball bearings; Alemite fittings for ease of lubrication.
6. Shouldered shaft for externally centering and maintaining alignment of rotor, resulting in equal rotor end clearances and eliminating contact between rotor and headplates.
7. Heavy body walls and headplates. Rigid construction to permit smallest possible rotor clearances. Permits at least one possible remachining after normal wear.
8. Standard companion flange size and bolt circle permits connection to pipe size flanges.
9. Integral cast lugs for drive provides universal mounting for any type motor reducer. Rigid drive for minimum space requirements. Eliminates drive stress between feeder and related equipment.
10. Shear pin coupling with simple standard bolt shear pin.
11. Gear motor with right angle combination drive. Can be furnished with a parallel shaft drive if desired.

FULLER COMPANY

100 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

Offices in Principal Cities Throughout the World

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PIT and QUARRY

MARCH 1960
VOL. 52 NO. 9

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✓ *Indicates a* PIT AND QUARRY *staff-written report*

Published on the first of each month for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel, Slag and other nonmetallic minerals.

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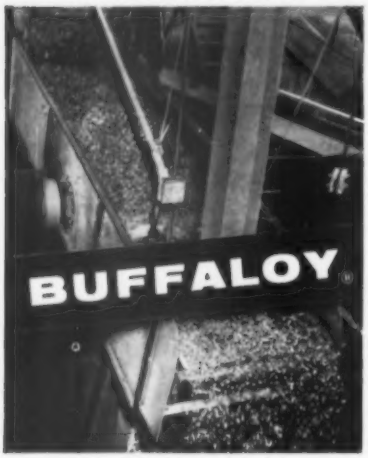
To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

SURE WAY TO CUT SCREENING COSTS



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You'll be time and money ahead with Buffalo Anti-Abrasive Screens. Woven from a special formula, high carbon steel wire, here are superior panels that provide many extra hours of service. Resistance to abrasion and ability to cope with heavy shock loads are unequalled, even by higher priced panels.

Long experienced in serving the mineral aggregates industry, Buffalo Wire Works possesses the necessary skills to produce a wide selection of weaves and mesh sizes, with virtually any type of edging, for meeting your needs precisely.

You'll want the whole story in New Bulletin 600P. Write.

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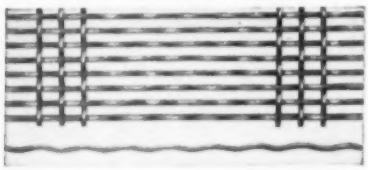
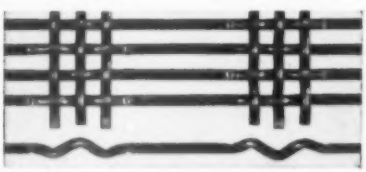
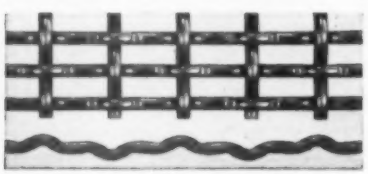
526 Terrace, Buffalo 2, N. Y.







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KEEPING AHEAD OF THE CRUSHER!

7 NORTHWESTS for EVERETT QUARRIES, INC. Plattsburg, Mo.

ROCK IS THE BUSINESS of Everett Quarries, Inc., at Plattsburg, Missouri—ag-lime and road stone! Here in the home pit, this Model 41 Northwest swings out around 240 tons an hour to keep ahead of the crusher. Everett Quarries uses Northwests in all of their pits. This Model 41 is their seventh Northwest Shovel.

In pits like this dependability counts. Repeat order purchases demonstrate a recognition of the performance you are looking for. *Your Northwest is always ready to go. We hear it everywhere, and Northwest users will tell you so.*

Your Northwest is built for the toughest job a shovel has to do. It's a *real* Rock Shovel—proved in years of service by reliable operators like Everett and other pit operators throughout the Midwest. It gives you higher output in rock and makes the easy digging easier. Smooth control, accurate spotting, the jerk-free swing that comes with Uniform Pressure Swing Clutches, and the Northwest Dual Independent Crowd combine to pour out the material. There are no slowdowns or delays in a Northwest digging cycle!

There is a lot more to the story. Ask for complete details on the size machine you need.

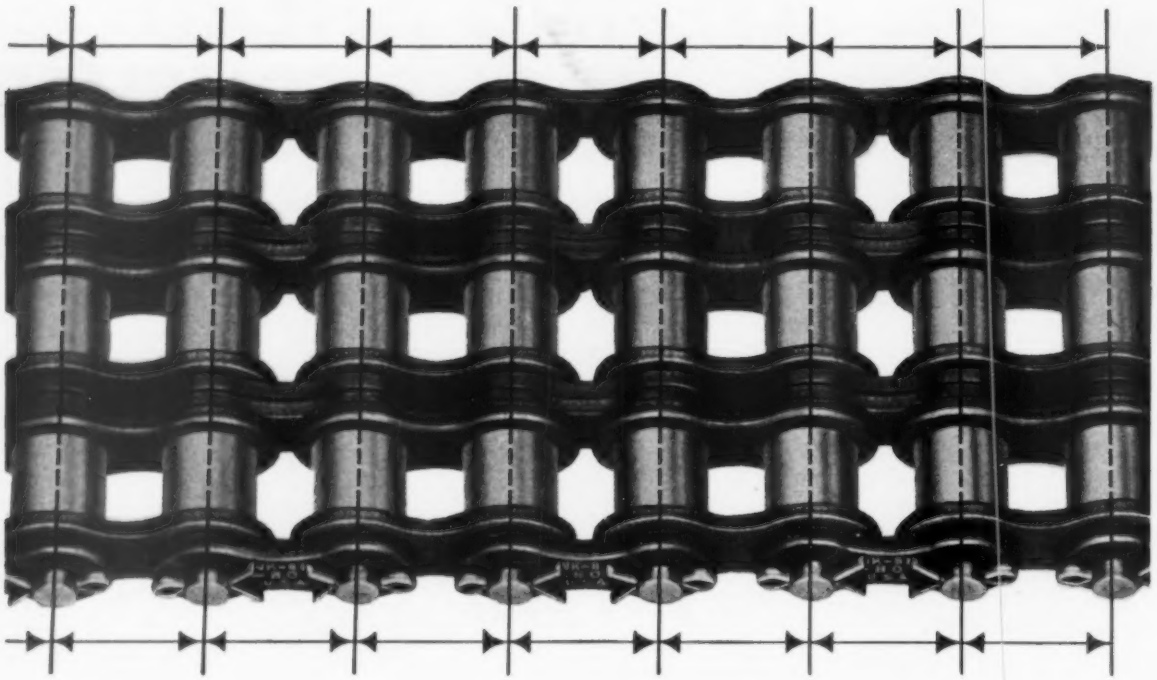
NORTHWEST ENGINEERING COMPANY
1515 Field Building • 135 South LaSalle Street • Chicago 3, Illinois

S-41-16-S

NORTHWEST *Always Ready to* **GO**

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yr. Capacity	13-Ton to 60-Ton Capacity	¾ to 3 Yd. Capacity	¾ Yd. to 2½ Yr. Capacity	25-Ton and 35-Ton Capacity



Equal length... equal strength

How pre-stressing ensures uniform load distribution of multiple-width LINK-BELT roller chain

Pre-stressing is one of the reasons why Link-Belt multiple-width precision steel roller chains easily handle the grueling loads common on today's drives. It seats and cold works the chain joint parts, assuring equal load distribution across the chain, minimum initial elongation, increased fatigue life.

Pre-stressing is just one of many "extras" that contribute to the *greater dynamic strength* of Link-Belt roller chain. Others include: close heat-treat control, lock-type bushings, shot-peened rollers, pitch-hole preparation. For details see Book 2657.

PRE-STRESSING MACHINE provides the pull that "sets" the parts of Link-Belt multiple-width roller chain. Besides assuring uniform load distribution, pre-stressing eliminates application difficulties on fixed center drives because the chain leaves the factory at precise operational length.

LINK-BELT

ROLLER CHAINS AND SPROCKETS

BOOK 2657 has 154 pages of roller chain data. Contact your nearest Link-Belt office or authorized stock-carrying distributor. (See CHAINS in the yellow pages of your phone book.)

15,077

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

90 to 120 Tons Per Hour

of 25% Oversize Material Passing a 1" Screen

- Low hopper height for loading from ½ or ⅜ cu. yd. shovel, or with front end loader.
- Heavy duty grizzly with openings that give higher crush production with minimum scalping.
- Adjustable single eccentric plate feeder, clutch-operated.
- Operator's platform permits view of entire plant, controls centrally located.
- Can be equipped with sand rejector.

Diamond makes everything for the aggregate producer:

Jaw Crushers • Roll Crushers • Conveyors • Screens and Washers • Feeders and Bins • Portable and Stationary Crushing Plants for Rock and Gravel.

High production *when you want it . . . where you want it.* That's the big feature of the *new* Diamond 1536 single-pass portable crushing plant. It can be readied in minutes for moving down the road or across the county and quickly set-up for more economical production. It's designed for counties, townships and contractors where tons produced must be high and mobility is a must.

You get dependable performance, and low operating cost from this rugged, compact plant equipped with a two-cubic-yard capacity loading hopper. The 24′ x 3′ 1½″ plate feeder, 15″ x 36″ jaw crusher, 3′ x 5′ 1½ deck vibrating screen and 30′ x 19′6″ delivery conveyor are mounted on a steel channel, gooseneck truck frame. It also carries the necessary drives, walkways, and ladders as well as optional equipment, including power unit, fuel tank, batteries, battery box and cables.

Delivery conveyor is hinged thus eliminating any dismantling for towing. The short wheel base and towing bar provide excellent maneuverability on road or in pit.

One way to be sure of getting the full story on the *new* Diamond 1536 is to see your Diamond distributor.

DIAMOND IRON WORKS
DIVISION
GOODMAN MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois

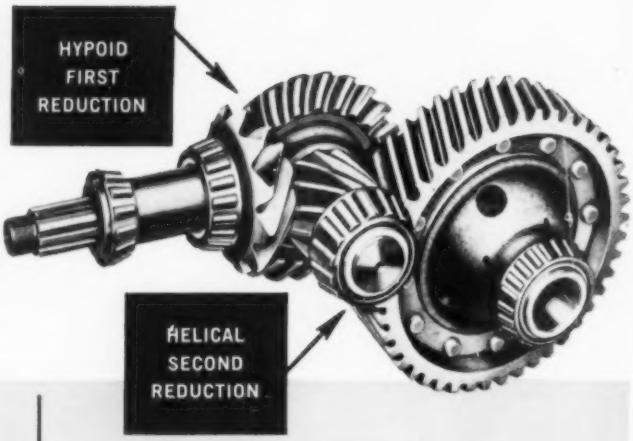
DIAMOND

Enter 7 on card, page 173

Heavy-Duty Hauling Jobs Are Easy With Timken-Detroit®

BALANCED HYPOID-HELICAL DOUBLE-REDUCTION AXLES

Timken-Detroit balanced hypoid-helical double-reduction gearing is unequalled for top performance and dependability. Outstanding advantages that make it the choice of heavy-duty equipment manufacturers and operators are: big, husky gears . . . greater flexibility in gear ratios . . . balanced gear set loadings . . . long life and low maintenance costs. The hypoid first reduction is 30% stronger than spiral bevel, and works in series with the second reduction to take an equal share of the load. In the helical second reduction, strong helical gears with a wide range of ratios insure balanced double-reduction gearing.

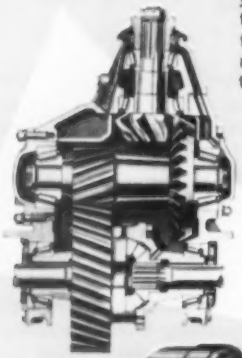


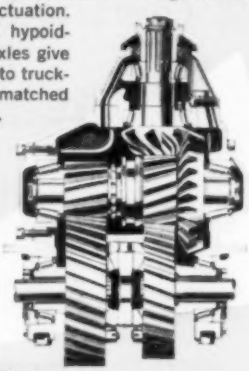
240 SERIES
SINGLE-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION

Two full-sized gear sets form a balanced power train—with each gear set accomplishing a substantial reduction. This combination of husky hypoid first reduction gears coupled with rugged, wide-faced helical second reduction gears provides a double-reduction gear set that outperforms all others. Because the ratios of each reduction may be varied, you get a balanced power train with the larger selection of axle ratios for maximum operational versatility and performance.

340 SERIES
TWO-SPEED, HYPOID-HELICAL DOUBLE-REDUCTION

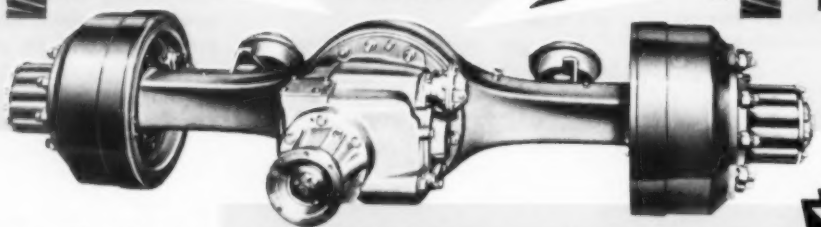
A true two-speed axle which provides two separate gear ratios through the use of two full-size helical gear sets . . . a "fast" ratio for maximum speeds and a "slow" ratio for greatest pulling power. Pick the most efficient gear ratio to meet your requirements of speed, load and road. Spring-flex power shifting provides simple, positive shifting with either air, vacuum or electric actuation. Timken-Detroit two-speed hypoid-helical double-reduction axles give a versatility and economy to trucking operations that is unmatched by other axle gear designs.





choice of two—

INTERCHANGEABLE BALANCED DOUBLE-REDUCTION DRIVES



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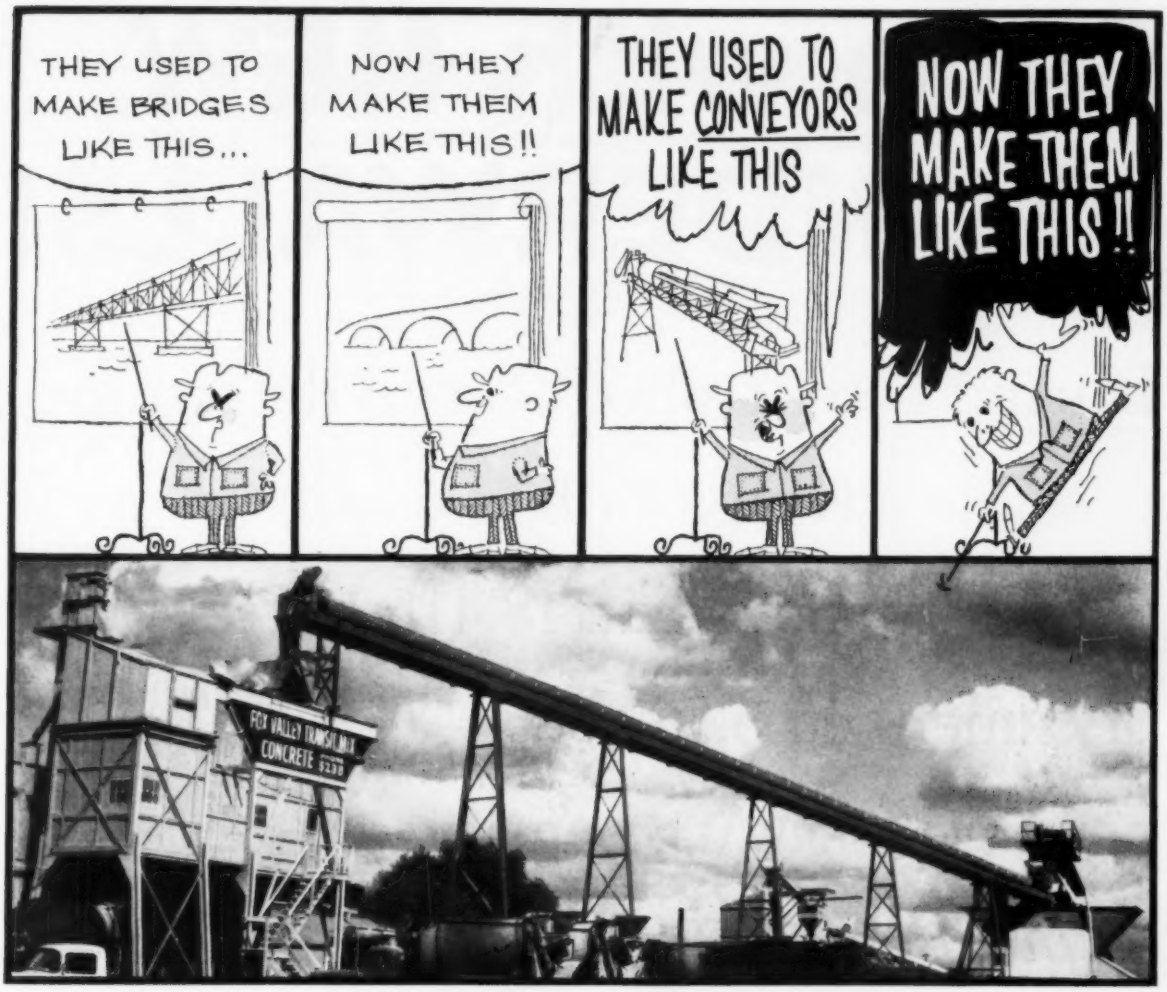
ROCKWELL R STANDARD

Transmission and Axle Division, Detroit 32, Michigan


THEY USED TO MAKE BRIDGES LIKE THIS...
NOW THEY MAKE THEM LIKE THIS!!
THEY USED TO MAKE CONVEYORS LIKE THIS
NOW THEY MAKE THEM LIKE THIS!!
FOX VALLEY TRANSIT MIX CONCRETE

STEPHENS-ADAMSON

SECTIONAL BELT CONVEYOR

FEATURING BENT PLATE DECKING

The exclusive STEPHENS-ADAMSON Bent Plate Decking feature provides a new concept in simplicity in conveyor erection. Four high-strength bolts fasten head assembly — eight bolts join intermediate sections — and six bolts connect tail assembly — for simplest and easiest installation ever. Bent Plate Decking affords protection for return run of belt. S-A Sectional Belt Conveyors are competitively priced.

The STEPHENS-ADAMSON Sectional Belt Conveyor combines quality conveyor components and features provided in no other pre-engineered conveyor in the low cost field.

Find out today why the advantages of the STEPHENS-ADAMSON Sectional Belt Conveyor featuring Bent Plate Decking make other types of pre-engineered conveyors obsolete.

WRITE FOR BULLETIN 458

S-A
ENGINEERED BULK HANDLING SYSTEMS
MATERIALS HANDLING PRODUCTS
SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERCO® BEARINGS & ROD ENDS

AVAILABLE IN 18", 20", 24", 30" and 36" WIDTH CONVEYORS — DELIVERED FROM STOCK

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
GENERAL OFFICE & MAIN PLANT, 20 RIDGEWAY AVENUE, AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA • CLARKSDALE, MISSISSIPPI
BELLEVILLE, ONTARIO

Save with NEW WONDERWALLS!

During a controlled test to determine possible savings in bag costs, 24 plants moved 1,118,415 barrels of cement in 5,282,966 new WONDERWALL bags.

Typical saving: $2.75 per M bags and reduced bag breakage as well.

NOW AVAILABLE! Stepped end WONDERWALLS from our plants at Wellsburg, W. Va., New Orleans, La., and Torrance, Calif.

WONDERWALLS save users money because they're made with Kraftsman Clupak*, the extra tough paper with the built-in *stretch*... pioneered by West Virginia. Because less paper is needed, substantial savings in bag costs naturally follow.

When it's a WONDERWALL, it withstands punishment that breaks ordinary multiwalls, and it also packs faster, handles easier, stacks better.

See how WONDERWALLS can cut *your* direct bag cost and reduce bag breakage too. For full information, write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y., or 1400 Annunciation Street, New Orleans 13, La.

**Clupak Inc.'s trademark for extensible paper, manufactured under its authority.*

West Virginia Pulp and Paper

Washington News Letter

By S. HERBERT UNTERBERGER

IN the 18th century when the subject of economics first began to be regarded as a separate discipline, it was not called economics at all. It was called *political economy*. This occurred for the obvious reason that the economists of that day regarded their findings as relevant to the political considerations of their times. And, indeed, they were. For example, the economists provided the rational underpinning of the 18th century British free trade policy.

Here, in the middle of the 20th century in the United States, we seem to be experiencing the same kind of development. In the search for new issues, the political parties have turned increasingly to the use of very sophisticated economic concepts. This is clearly illustrated by the current debate over the effect of the increasing interest rates on the rate of growth of the American economy. It is the Democratic party, principally, which gives the appearance of hoping to take this debate into the political arena and use it as ammunition in the forthcoming presidential election.

The matter was brought forcibly to the fore by the recent reports of the Joint Economic Committee of Congress, which is dominated by a Democratic majority. It is obvious from this report that the Democrats hope to attack the Eisenhower Administration's tight money policy. If they follow the report, they are going to charge that this policy is a complete failure. First, they are going to say that while the policy was specifically designed to avoid inflation, it has not accomplished this. As a matter of fact, throughout the years of the Eisenhower Administration, consumer prices have risen at an average rate of 1.4 percent a year. Furthermore, they are going to say—and will be the burden of their principal argument—that the high cost of borrowing money has hindered the nation's growth.

In connection with the latter argument, they will try to drive home two points. First, they will point out that during the Eisenhower years economic growth has averaged only 2.3 percent per year. They will say that this rate should be from 3.5 to 4.5 percent per year. As evidence that this is not only attainable, but had once been attained, they will point to the 1947-53 period, when they controlled the White House and growth averaged 4.6 percent per year. Second, they will try to clinch their argument with the observation that economic growth in the Soviet Union has been running at the rate of 6 percent a year or more and shows no signs of declining. This statement will then be viewed with appropriate alarm.

Then will come the reason for our slow economic growth. According to this report, our unsatisfactory economic position is due in great part (if not entirely) to the fact that every time the economy was showing real growth, the Republican policy of raising interest rates, in the hope that it would avoid inflation, stopped the trend.

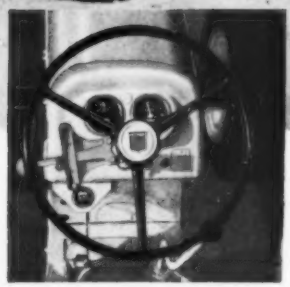
Never failnig to miss an opportunity to make an appeal to the small businessman's vote, the Joint Economic Committee Report suggests that the groups affected most adversely by high interest rates were small businessmen, home builders, and state and local governments. It argues that the spending of these groups is rarely very inflationary. The principal reason for the futility of the Republican program, as stated in the report, was that it had virtually no effect on the spurts in consumer spending, particularly with the use of consumer credit. Each of these spurts added an uncontrolled inflationary push. Moreover, it is stated, the spending done by big business, because the money came primarily from retained earnings, was not at all affected by changes in interest rates.

Nevertheless, say the authors of the report, the tight-money pinch has limited the economic growth of the nation seriously. The fact that there is some internal inconsistency in this line of argument is pretty largely overlooked. It is not very well explained exactly why economic growth was hindered by tight money which, however, was not tight to the principal corporations whose expansion accounts for most of the economic growth.

The alternative, as set forth in the report, is principally a bid for flexibility in tax income. The authors of the report would have the tax take rise more rapidly in periods of extreme prosperity and fall more rapidly in periods of recession. This device, they claim, would achieve a better anti-inflationary result; it would syphon off excess incomes when they rise more rapidly than the supply of goods, without making further investments improfitable (particularly for small businessmen and other similarly situated persons) because interest rates have been forced up too high.

In advancing this argument, the Joint Economic Report authors manage to overlook the usual counter-argument—that income taxes, the principal source of federal taxation, are already so high that they inhibit

(*Continued on page* 73)



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Add the total *ease* of handling the 888 gives you—shift-free, clutch-free back-and-forth cycling plus effortless power steering—and you come up with today's fastest, most maneuverable 1-yd. loader. Oliver puts instant forward-and-reverse control handy at your finger tip under the steering wheel—where it belongs.

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Choose your Oliver 888 with "Reserve-O-Torc" and power steering options...and with smooth, 6-cylinder gas or diesel engine.

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Labor Developments

1959 Trend in Wage Increases

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

MOST of the workers covered by collective bargaining contracts received wage increases during 1959. For about 40 percent of them the wage increases were actually negotiated in 1959. For the others they were frequently deferred increases provided by long-term contracts negotiated in earlier years or those included under cost-of-living escalator adjustments previously made.

It may be of special interest that the increases negotiated in 1959 were generally lower than those worked out in previous years; in general, they averaged less than 9 cents an hour. Actually, the average raise during that year was 10 cents an hour, but this amount included increases which had been arranged previously. This figure also is lower than the increases in the preceding years. In 1957 and 1958, the average raise amounted to 12 cents an hour or more. The smaller amounts effective in 1959 are due in part to the relative stability of the cost-of-living index during the first half of that year, which resulted in very few cost-of-living adjustments being made during that period.

New Look in Cost-of-Living Escalation

Until very recently most of the cost-of-living escalator clauses included in union agreements looked very much like the clause introduced in 1948 by the General Motors Corporation and the United Automobile Workers. For the most part, they set forth the amount of cost-of-living adjustments which would result from given increases in the B. L. S. Consumer Price Index. These adjustments made generally were on a quarterly basis. To be sure, there were a few cases where the cost-of-living escalator clauses were eliminated, and the increases given thereunder were incorporated into the basic wage rates.

In 1958 and 1959 some change in thinking began to be evident with respect to cost-of-living escalator clauses. A few agreements negotiated in the latter part of that period in the automibile parts industry started a trend by setting a maximum on cost-of-living adjustments. This trend was reinforced in a few agreements (notably those in Pacific Coast shipbuilding) by the provision for cost-of-living adjustments only if and to the extent that the amount due under the escalator formula exceeded the deferred increases provided by the contract.

The final stage of this development was reached during the settlement in the steel industry. In this case the Kaiser Steel Corporation and the United States Steel Workers of America initially agreed that the workers would forego any cost-of-living benefits due in January, 1960, but that there would be semi-annual adjustments thereafter. However, those adjustments that go into effect during that 20-month contract period cannot exceed three cents.

In addition, some part of the cost-of-living adjustments may not be paid to the workers at all but may be used to defray some of the cost of the additionally negotiated health and welfare benefits. The same pattern was carried over into the contracts agreed to by the United States Steel Corporation and the other principal steel producers, in which ceilings were placed on the escalator figure. Moreover, certain offsets could be made for additional health and welfare benefits.

In effect, cost-of-living adjustments no longer appear to be absolute necessities for the purpose of maintaining consumer income as prices rise. Particularly noteworthy is the trend to use a part of the escalator provisions to defray the expense of certain fringe benefits. It is essentially implied in this kind of arrangement that the basic wage rates of steel workers, at least, have sufficient surplus in them so that further increases in living expenses can be absorbed without seriously impairing their standard of living.

However, protection against certain vicissitudes of life are included in those standards. If prices rise, those workers may find it more difficult to pay for such protection. Accordingly, arrangements have been made to use cost-of-living increases, wherever necessary, to meet these special costs.

Nevertheless, the inviolability of cost-of-living adjustments, regardless of how high they may go, is no longer a basic requirement.

1960 Expectations

A large number of the major collective bargaining agreements in the United States are due to be negotiated during 1960. Unless there is a substantial change in the negotiating pattern, therefore, it looks as though 1960 will be a very difficult labor relations year.

Perhaps the most serious problems are those which may occur in railroad negotiations. With respect to wage changes, it now appears that this issue may be settled somewhat more easily than was previously expected. The Brotherhood of Locomotive Engineers has just announced its agreement with the railroad to submit their wage disputes to final and binding arbitration. If this action

(*Continued on page 73*)

← *Enter 12 on card, page 173*

APPLYING TECHNOLOGY TO ELIMINATION OF NUISANCE DUST...

Open the housing of the MIKRO-PULSAIRE Collector and you've discovered the secret of finer filtering efficiency and more economical nuisance dust recovery. You'll note there are no cams, gears, chains or other high replacement-cost components — no mechanical moving parts whatever! Product of Mikro research and development, the MIKRO-PULSAIRE is a completely simplified unit that provides full-time automatic cleaning with constant low-differential pressure . . . and a filtering efficiency of 99.9% plus. Maintenance, of course, is virtually eliminated, and bag life is increased many times over, especially where abrasive or corrosive materials are concerned. There's a MIKRO-PULSAIRE for every industrial nuisance dust collection job, in single or modular units, with capacities from 20 cfm to any known requirement. Bulletin 52A gives details on sizes and capacities . . . and the Mikro Laboratories are at your service to help you select the unit for your particular requirements.

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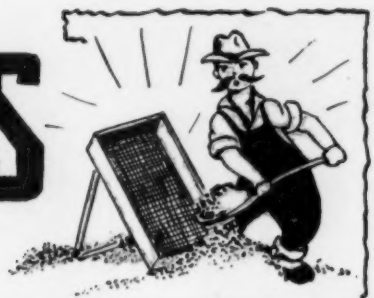
SCREENINGS



By RAY L. SMITH JR.

WE'VE ALL just emerged from two solid weeks of conventioning, and everyone is still a bit dazed from the experience. It will probably be some time before the entire staff gets a grip on themselves so that they no longer rush up to a total stranger, pump their hands up and down, and demand to know how the wife and kids are.

Mystic Verse

SPEAKING of sales gimmicks (we haven't yet, but we'll get around to it), here's one that beats them all, it could be called a poem; and since it was composed by Greg Johnson, our central advertising manager in Cleveland, it must be true.

The Cleveland boys were touring from home base to Chicago to attend the annual conventions of the National Sand and Gravel Association and the National Crushed Stone Association. Charley Bussmann, a PQ veep, made the bright statement that even though he didn't know a lot about everything, he figured he did know quite a bit about the field he was selling.

Ralph Scott and Greg couldn't quite make up their minds, yes or no, so they decided to consult their ancestors. This was done on the spot. The car's lights were dimmed, and a seance followed. Of course, we heard none of the conversation, but we're happy to go along with it after the boys on earth swore that a poem was offered to them by dear cousin Jasper, twice removed. So they accepted the offer, and it is printed below as evidence.

> We don't know how to process steel
> or make the railroads run
> or how to build a bigger wheel
> or how pure silk is spun;
> but when it comes to minerals
> of the nonmetallic group,
> we're *experts*, and we know just how
> to give you all the scoop.
>
> J.G.J

She's Puncture-proof, Too

THE Harmo Tire & Rubber Corp. exhibit at the recent NSGA and NRMCA meetings in Chicago turned up a new variation in Flotation equipment. The pneumatic young lady pictured here has been selected as Miss Flotation of 1960. So far as we can discover, she has no proprietary interest in the tire industry. However all the producers in attendance have selected her as the girl they would like most to be tired with.

Harmo advises that the young lady is not a member of the rubber manufacturers union, and she is not furnished with the tire to keep it floating.

Pit and Quarry Editor Sandy Herod, the photographer who took the picture seems to have had something else on his mind, though he did manage to call attention to the fact that Miss Flotation has her hand on a Track Grip Tire (see cut below).

Beats us how they can expect to demonstrate anything about tires with her hanging around in *that* get-up.

Potpourri and Succotash

An automobile is a machine with four wheels, a motor and not quite enough seats, which enables people to get about with great rapidity and ease to places they never bothered going before, and where they would just as soon not go now because now that they are there, they have no place to park.

A welder came home without his pay and his wife asked him what he spent it for. He thought awhile and said: "I bought something for the house."

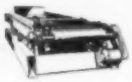
"What," she asked sarcastically, "did you buy for the house?"

"Twelve rounds of drinks."

Assembled in the Nordberg shops recently for operational testing, this two compartment ball mill is one of the largest ever made. The Volkswagen looks like a toy by comparison.

SYMONS PRIMARY GYRATORY CRUSHERS

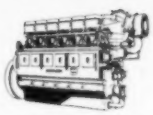
SYMONS® CONE CRUSHERS



SYMONS VIBRATING SCREENS

SYMONS VIBRATING GRIZZLIES

ROTARY KILNS and COOLERS



NORDBERG ENGINES

NORDBERG sets the pace in LARGE GRINDING MILLS

to turn out greater tonnages at lower cost per ton

Nordberg has recently completed five of the largest grinding mills ever built for industrial service. These two compartment Nordberg ball mills (see opposite page) are 12 feet in diameter by 36 feet long, each powered by a 2500 hp synchronous motor, operating at 10% beyond rating. These mills are being installed in a new 5 million barrel per year wet process cement plant. The economies of using very large grinding mills to turn out greater tonnages at lower cost are important, however, to many other large ore and mineral reduction processes, as well.

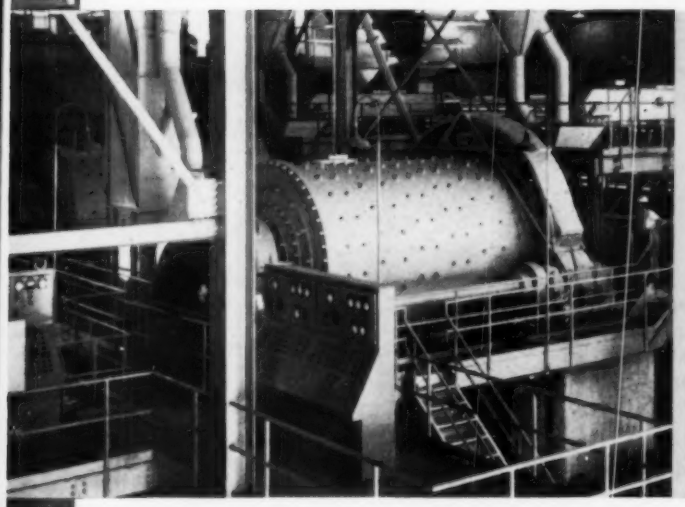
Consider some of these basic advantages:

1. *Lower construction and installation costs* . . . A single, large mill requires less floor space than several smaller ones, and only one foundation is required. Thus, construction costs are lowered and, in most cases, production is increased.

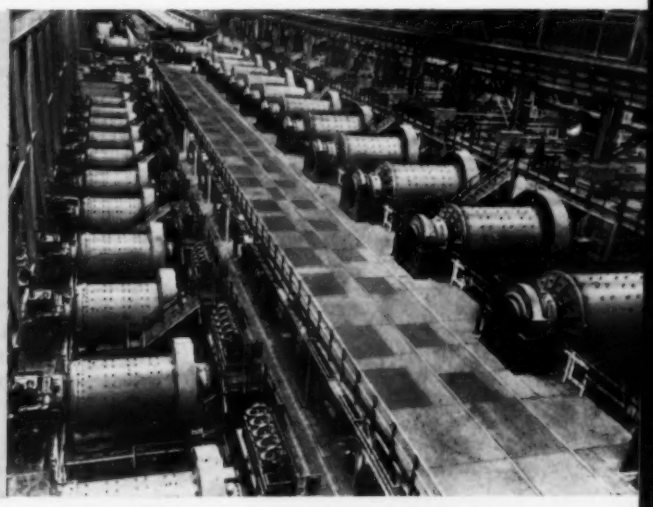
2. *Simpler automatic operation* . . . Where automatic operation is required, larger mills permit simpler handling with fewer controls. This lowers initial investment and minimizes installation and operational problems of automatic controls.

3. *Less maintenance* . . . Here, costs are again related directly to the number of mills installed. Fewer units mean less wearing parts and more dependable production. Exceptional savings may also be realized in replacement liners alone.

These are significant reasons behind the current trend toward larger grinding mills. But whether you require large or small grinding mills, you can count on the proven experience of Nordberg in furnishing the right grinding mill to meet your specific needs . . . including Rod, Ball, Pebble, Tube and Compartment types, in sizes from 6 to 13 feet in diameter and up to 50 feet in length. *Write for further information.*



Shown here are two of five 11′ x 17′ Nordberg Ball Mills—three raw and two finish—installed in a midwest cement plant that has a capacity of 3,000,000 bbl. annually.



The largest iron ore mill installation in the world with 58 Nordberg Grinding Mills. This concentrator building houses 27, 10′ x 14′ rod mills and 27, 10′ x 14′ ball mills. Four Nordberg mills serve as standby units.

NORDBERG MANUFACTURING COMPANY, Milwaukee 1, Wis.

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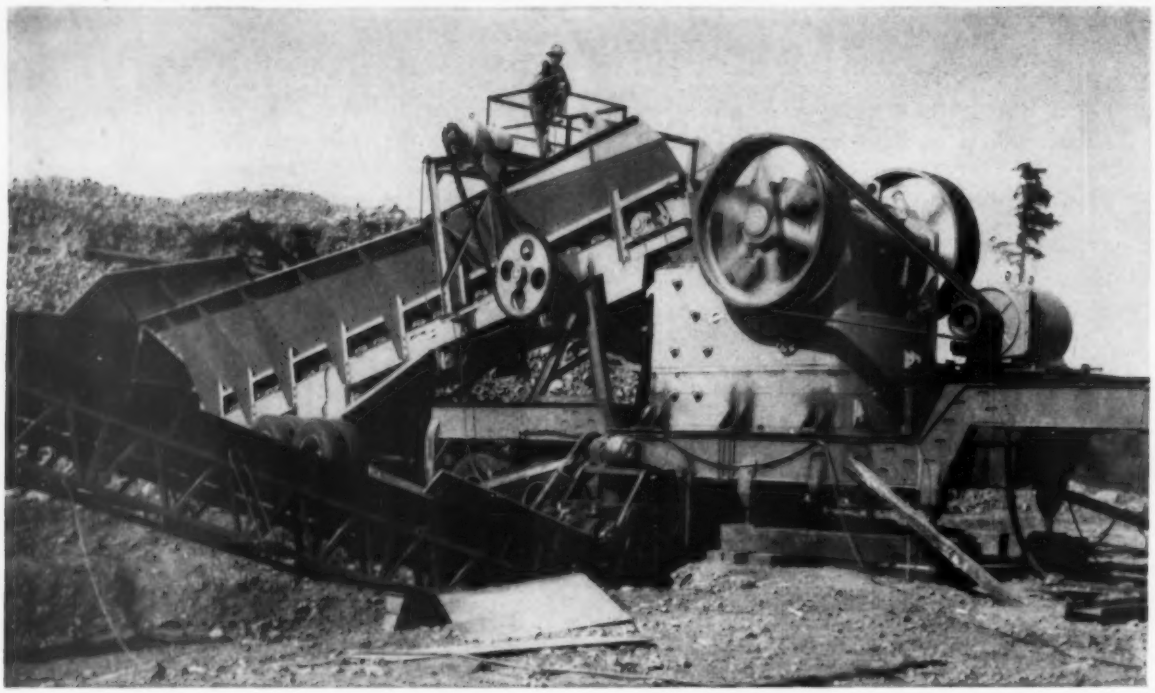


Shock loads can't kill

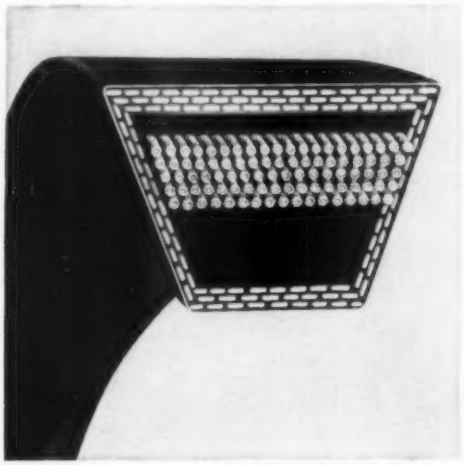
New Dayton BLUE-RIBBON® V-Belts

The new Blue Ribbon V-Belt line was designed by Dayton to stand-up to the severe punishment of mining, quarrying and processing operations. It has done this so successfully as to establish new standards of V-Belt performance and endurance in the industry.

The Blue Ribbon series is not just a redesigned line, but a totally new approach to V-Belt construction . . . new materials, new design, new specifications.

Check these outstanding features:

- *Now, Blue Ribbon V-Belt* horsepower ratings are increased 40% over previous standard belts. Load carrying capacity is doubled. New super-strength, synthetic cords absorb machine killing shock loads and vibration . . . protect machinery . . . prolong belt life.
- *Extreme length stability* and precise manufacturing mean that belts can now be ordered in perfectly matched sets. Thus each belt pulls its share of the load increasing drive performance and bearing life.



Blue Ribbon Thorobred V-Belts are available in A through E cross-section industry standard sizes.

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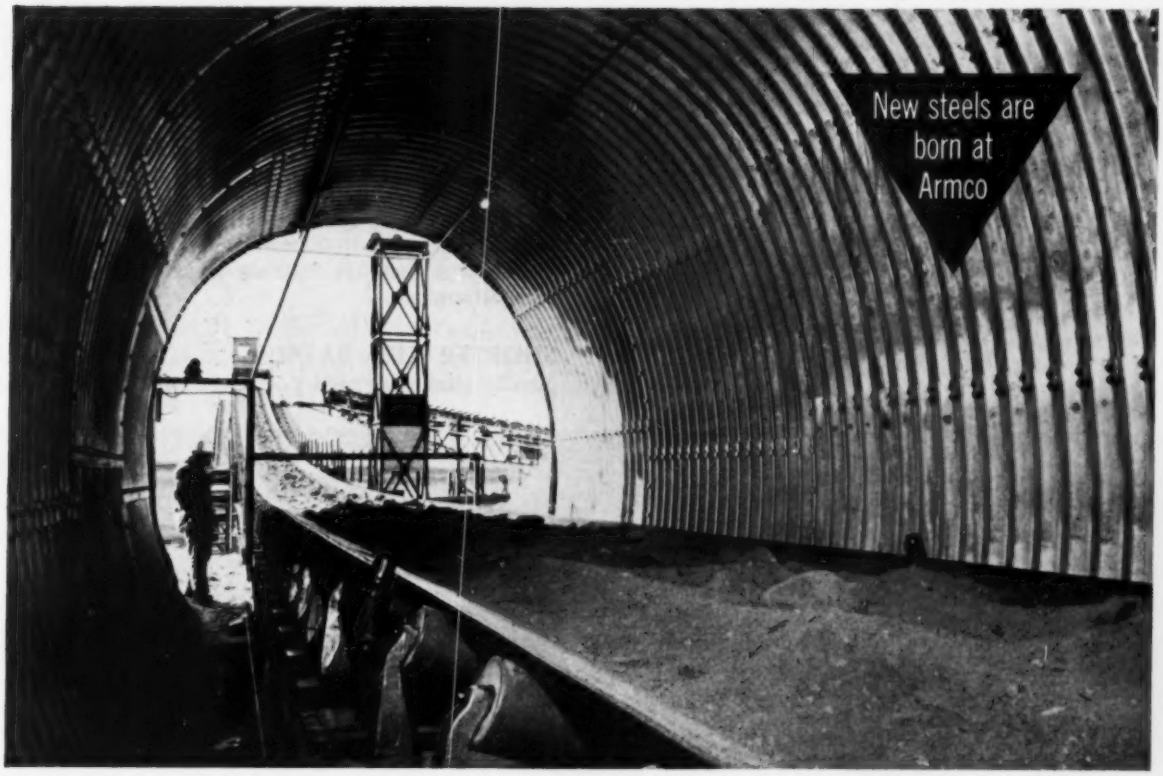

Armco Pipe Encloses Conveyor System Under 80-Foot Storage Pile

This Armco MULTI-PLATE® reclaiming tunnel, located beneath an 80-foot aggregate pile on a large earth-moving job in Utah, demonstrates the extra strength you get with Armco Pipe. Its high strength has been proved in thousands of installations under loads ranging as high as 125 feet.

Armco MULTI-PLATE is ideal for conveyor tunnels in permanent plants or on large construction jobs. It can be installed quickly and easily. Find out more about Armco MULTI-PLATE Pipe and other Armco Corrugated Metal Structures. Write us for complete data. Armco Drainage & Metal Products, Inc., 5240 Curtis Street, Middletown, Ohio.

Workers install one of the hatches for the conveyor tunnel shown above. The opening was reinforced with steel I-beams.

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Question 1:

What's <u>different</u> about Haulpak®?

ANSWER: The LW Haulpak is like other off-road trucks *only* because it has wheels and an engine! Otherwise, its design is completely different . . . for your benefit. For instance:

RIDES ON AIR — Other trucks ride on steel springs that need much attention. Haulpak eliminates this major cause of downtime with the exclusive LW HYDRAIR* suspension system. With it, Haulpak *rides on air* . . . the load rides smooth and level on rough roads. You can safely use faster hauling speeds, move more tons per hour. Hydrair also makes possible many other advantages:

SHORTER TURN RADIUS — Because Hydrair suspension eliminates need for conventional springs and

Notice the deep "V" body which permits Haulpak to carry about 25% of its load below what would be the floor line of a conventional hauler. This gives greater stability, permits faster travel on turns and steep grades. ▶

Here's HYDRAIR

This sturdy, simple air-hydraulic suspension replaces the usual leaf springs found in conventional off-road equipment, relieving Haulpak owners from expensive spring repair and maintenance. Hydrair cushions against loading and travel shocks, compensates automatically for off-center loading, and keeps the load riding level over bumps and holes, for faster, more profitable hauling cycles.

Question 2:

How does Haulpak <u>save you</u> money?

ANSWER: From the answers above you can easily see how this all-new hauler *saves* on hauling costs, gives you:

- **greater maneuverability**
- **lower operating cost**
- **lower maintenance**
- **faster hauling**
- **more pay-tons per hour**
- **...and bigger profits**

front axles, Haulpak's front wheels can be turned at sharper angles . . . permits U-turns in 2/3rds the space required by competitive trucks. And without need for springs and axles, Haulpak can be built with a shorter wheelbase for more efficient transfer of power-to-wheels. There is, however, no loss in load capacity, because you get the LW exclusive . . .

DEEP "V" BODY — This permits carrying about 6 tons of material *below* the normal floor-line of conventional trucks. It also gives you a lower center of gravity, better stability on turns and steep grades.

HAULS THROUGH DEEP MUD — Haulpak is equipped with the famous LW power-transfer differential, used for many years in thousands of heavy-duty Tournapull® earthmovers all over the world. When one drive wheel begins to slip, power is transferred automatically to the wheel on firmest footing. Soft going does not stop Haulpak!

MANY OTHER MONEY-SAVERS! You save on fuel, because Haulpak is built of the newest lightweight high-tensile strength steels . . . to reduce deadweight and increase pay-load. Also, Haulpak gives you power-shift Torqmatic transmission, full power-steering, multiple-disc brakes with 5,148 sq in. total braking surface, double-acting hydraulic rams that lift body to 70° tilt in 16 seconds for fast dump. And lubrication check is reduced to only 3 easily-reached fittings needing attention only at 500-hr intervals. Haulpak is not just a "beefed-up" highway truck . . . it is a totally new concept developed to cut off-road hauling costs.

Next time you need an off-road hauler, investigate Haulpak. Now available in 3 sizes: 22, 27, and 32 tons capacity. Request literature, and ask to see our new color movie, "*Revolution on Wheels*".

*Trademark HP-2261-G-2

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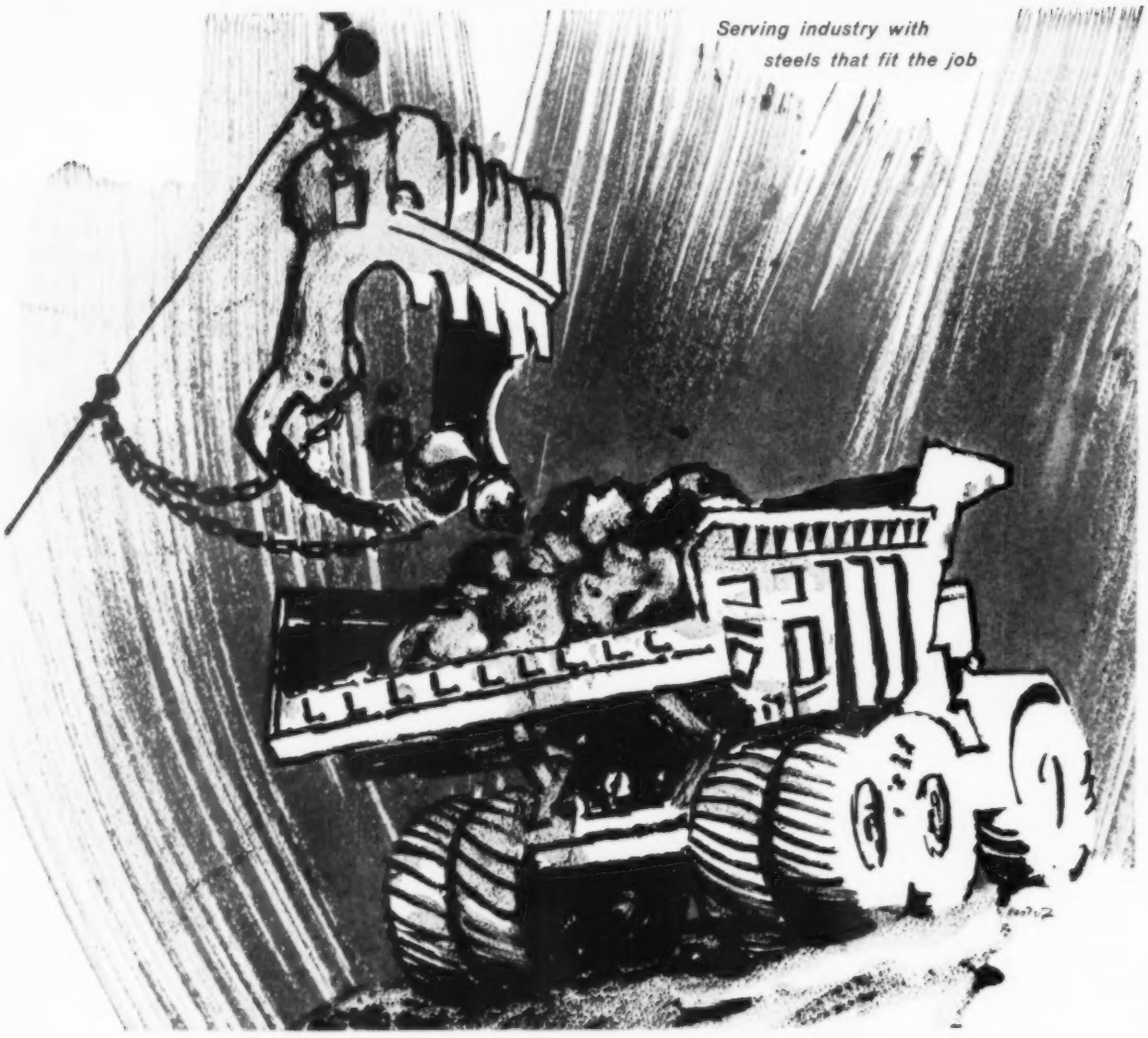

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TRADEMARK

Where the going gets rough, versatile Lukens "T-1" steel fights back. For repair or modification of heavy duty equipment such as truck beds, chutes, bucket teeth and dozer blades, this special duty steel plate can be ordered from *warehouse stock* in a wide range of plate sizes and gages. Lukens "T-1" is the modern mining steel—you can work and weld it in the field as readily as in your shop. Its terrific resistance to abrasive impact—coupled with an extremely high yield strength—means fewer replacements and often greater payloads. That's why more and more equipment builders are using Lukens "T-1" to provide longer life in shovel buckets, trucks and other mining equipment. Remember to specify the extra-tough 321 min. BHN quality. For performance and application details, request our special booklet, "Lukens 'T-1' for Toughness." Address Manager, Application Engineering Dept., 030 Services Bldg., Lukens Steel Company, Coatesville, Pennsylvania.

You can order Lukens "T-1" steel plate from these Steel Service Centers:

Alabama, BIRMINGHAM 2, O'Neal Steel, Inc., P.O. Box 2623 • **California,** LOS ANGELES 54, Earle M. Jorgensen Co., P.O. Box 2358, Terminal Annex, 10650 S. Alameda St. • LOS ANGELES 33, The R. J. M. Company, 238-248 South Mission Rd. • **Illinois,** CHICAGO 8, Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts. • **Kentucky,** ASHLAND, Mansbach Steel Co., 19th St. and River Front • **Maryland,** BALTIMORE 2, Wm. G. Wetherall, Inc. 317 President St. • **New Mexico,** ALBUQUERQUE, Miller and Smith Mfg. Co., Inc., 500 Phoenix Ave., N. W. • **Ohio,** CLEVELAND 6, Mills-Wolf Steel Co., 12434 Cedar Rd. • **Oregon,** PORTLAND 4, J. E. Haseltine & Co., 115 S. W. Second Ave. • **Pennsylvania,** McKEES ROCKS, Follansbee Steel Co., 200 Bradley St. • **Quebec,** MONTREAL, Drummond, McCall & Co., Ltd. 930 Wellington St. • **Utah,** SALT LAKE CITY, Structural Steel & Forge Co., P. O. Box 300 • **Washington,** SEATTLE 4, Stack Steel & Supply Co., 500 Landers St. • SPOKANE 10, Union Iron Works, East 217 Montgomery Ave., P. O. Box 2135.

LUKENS

News of the Industry

Louisiana Lime Plant Now Under Construction For U.S. Gypsum Company

Construction has begun on what is said to be the first lime plant ever built in New Orleans. The $1,500,000 plant is going up for United States Gypsum Company near its gypsum products plant. (See PIT AND QUARRY, September, 1959, p. 23). Completion of the plant is scheduled for September.

Southwestern Engineering Company, general contractor, is constructing facilities for unloading, stockpiling, and preparing raw material; a 10- by 250-ft. rotary kiln for calcining; and other equipment for packaging and storing finished lime products. The latter items will include building lime, quicklime, and hydrated lime for use in water softening and road building, and for sugar refineries and chemical plants.

Raw material in the form of clamshells from Lake Pontchartrain will be supplied by local concerns and brought to the plant site by barge. Finished products will be shipped out either by truck or by the New Orleans Public Belt Railroad to serve a local market area encompassing Louisiana and Mississippi, and an export market in Central America. U. S. Gypsum's existing office and quality laboratory will serve both the lime and gypsum plants.

Cuyahoga Lime Co. Formed To Make Metallurgical Lime

Spokesmen for the Minerals & Chemicals Corporation of America and the Neville Lime Company have announced the formation of a jointly-owned concern, the Cuyahoga Lime Company, to make metallurgical-grade lime for the Cleveland steelmaking industry.

The plant to be erected for the new firm will cost between $1 million and $2 million. It was stated that the vertical lime kiln design developed by Chemstone Corporation, a wholly owned Minerals & Chemicals subsidiary, will be utilized at the new plant. Limestone from the Min & Chem quarry at Presque Isle, Mich., will be used in producing the metallurgical lime.

Dow Chemical to Produce Lime Using Lepol-type Grate Kiln

An Allis-Chalmers Lepol-type grate kiln will be used for the first time in the United States for lime production at the Dow Chemical Company plant in Ludington, Mich.

Upon completion, the 11½- by 160-ft. kiln, now being installed, will have a capacity of 600 tons of lime per day—possibly the largest capacity in the world. ACL kilns have been used by cement producers for several years.

Dewey Portland Cement Co. Sold to American-Marietta As Independent Division

Plans for the purchase of the Dewey Portland Cement Company by the American-Marietta Corporation were implemented recently.

Under the terms of the agreement, A-M will exchange 8¼ of its common shares for each ten Dewey shares. The latter has approximately 1,784,000 shares outstanding. In addition to a plant under construction at Tulsa, Dewey has plants at Dewey, Okla., and Davenport, Iowa.

Combined cement production of the two companies will amount to more than 22 million bbl. annually.

Dewey will become a separate division of A-M, with Waldo E. Tyler serving as president and chief executive officer of the division. He will also be a director of A-M.

Coming Events

March 14-17, 1960—New York City. 56th annual convention, American Concrete Institute. Commodore Hotel.

March 31-April 1, 1960—Galveston. Plant Operators Committee meeting, National Slag Association. Jack Tar Hotel.

April 21-22, 1960—Los Angeles. Southwest Metals and Minerals Conference, American Institute of Mining, Metallurgical and Petroleum Engineers. Ambassador Hotel.

May 17-19, 1960 — Milwaukee. Second Technical Conference of Cement Industry Sub-Committee, The American Institute of Electrical Engineers. Hotel Pfister.

May 23-25, 1960 — Sea Island, Ga. Annual convention, National Lime Association. The Cloisters.

June 13-14, 1960 — Chicago. Board of directors meeting, National Limestone Institute, Inc., Edgewater Beach Hotel.

June 26-July 1, 1960 — Atlantic City. 63rd annual meeting and apparatus exhibit, American Society for Testing Materials. Chalfonte-Haddon Hall.

3% December Decline In Construction Awards Offset by '59 Record Total

December construction contracts in the United States (excluding Alaska and Hawaii) totaled $2,224,060,000, down 3 percent from December, 1958. But the total for contracts during the entire year of 1959 set an all-time record of $36,268,544,000 despite the declines in the last five months of the year, according to F. W. Dodge Corporation. This total was 3 percent ahead of 1958, the previous record year.

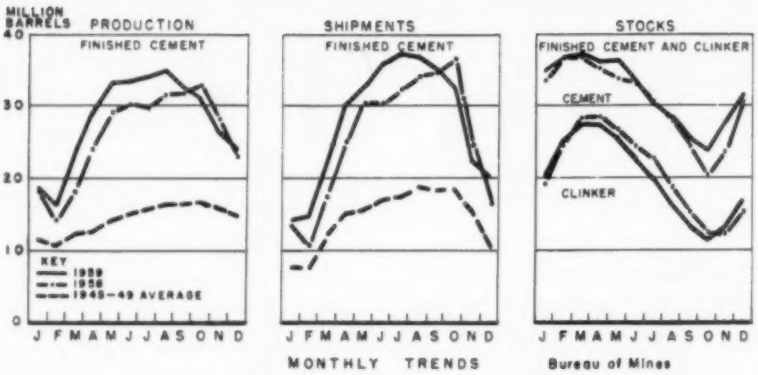
The December decline was the smallest in any of the last five months, and the seasonally adjusted Dodge index actually rose from 231 in November to 244 in December (1947-49=100). Moreover, the December drop was almost entirely the result of a steep decline in highway contracts. Nearly everything else went up.

Item: housing was particularly encouraging despite high interest rates, with dollar volume for residential building at $993,185,000 — a new record for any December, and 1 percent ahead of December, 1958.

Item: non-residential building categories showed the most strength, with very sharp increases in industrial, religious, and hospital buildings, and smaller gains in commercial and educational buildings. These totaled $790,238,000 — up 6 percent from December, 1958.

Item: heavy engineering showed the greatest weakness, which was mainly the highway situation. Contracts totaled $440,637,000—down 20 percent from December, 1958.

Cumulative totals for 1959 as a whole and the percentage changes from 1958: residential building—up 17 percent to $17,149,677,000; non-residential building—up 4 percent to $11,386,604,000; heavy engineering —down 18 percent to $7,732,263,000.



December, 1959, Finished Portland Cement, and Preliminary Summary for 1959

■ DECEMBER SUMMARY—Production of finished portland cement in December, 1959, as reported to the U.S. Bureau of Mines, totaled 24,111,000 barrels, an increase of 2 percent compared with December, 1958. Mill shipments in December, 1959, totaled 20,328,000 barrels, an increase of 22 percent compared with December, 1958. Stocks of 31,328,000 barrels of finished cement on hand December 31, 1959, were 2 percent more than those on hand December 31, 1958. Clinker production during December, 1959, totaled 27,390,000 barrels, an increase of 1 percent compared with December, 1958.

PRODUCTION—One hundred and sixty-five (165) plants in 38 states and Puerto Rico reported a production of 24,111,000 barrels of finished portland cement during December, 1959, compared with 23,590,000 barrels produced during December, 1958.

Production of clinker during the month of December, 1959, was 27,390,000 barrels, compared with 27,029,000 barrels during the same month last year.

High-early-strength portland cement in December, 1959, totaled 1,614,000 barrels, a decrease of 4 percent from December, 1958.

Prepared masonry cement production in December, 1959, of 1,306,000 barrels increased 28 percent over the December, 1958, production.

SHIPMENTS—Mill shipments of finished portland cement for December, 1959, totaled 20,328,000 barrels, compared with 16,623,000 barrels in December, 1958.

In December, 1959, shipments were higher in 18 districts and lower in 5 districts than in December, 1958. The greatest increases were in the Illinois, Ohio, and New York-Maine districts.

Mill shipments of high-early-strength totaled 1,190,000 barrels, an increase of 24 percent over the 957,000 barrels shipped in December, 1958.

Mill shipments of prepared masonry cement in December, 1959, totaled 1,169,000 barrels, an increase of 57 percent over the 746,000 barrels shipped in December, 1958. Over one-half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 31,328,000 barrels of finished portland cement were on hand December 31, 1959, an increase of 2 percent over the 30,800,000 barrels on hand December 31, 1958. Stocks of clinker on hand December 31, 1959, totaled 16,470,000 barrels, an increase of 6 percent over the 15,505,000 barrels on hand December 31, 1958.

■ PRELIMINARY 1959 SUMMARY—As reported to the U.S. Bureau of Mines, production and shipments of portland cement increased 9 percent each in 1959 over the 1958 figures. Production in 1959 totaled 338,527,000 barrels, as compared with 311,319,000 barrels in 1958. Shipments in 1959 totaled 335,036,000 barrels, as compared with 307,040,000 barrels in 1958. These figures set new records for the cement industry. Although some segments of the cement industry were affected by the prolonged steel strike during 1959, most companies reported little loss of market due to the strike.

(Note: shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: December, 1958—194,000 barrels; January-December, 1958—2,634,000 barrels; December, 1959—249,000 barrels; January-December, 1959—2,914,000 barrels.)

Five new plants were opened during 1959—one each in Arizona, Mississippi, New Mexico, New York, and Texas. Substantial increases in capacity were reported at 22 plants, and these in addition to the new plants, raised the annual production capacity from 402,786,000 barrels on December 31, 1958, to 413,626,000 barrels on December 31, 1959.

Imports of cements were estimated at 4,900,000 barrels during 1959, an increase of 14 percent over the 1958 figure. ●

New Mexico Plant Going Up For American Gypsum Company

Construction has begun on the $3,000,000 American Gypsum Co. plant near Albuquerqe, N.M. (See PIT AND QUARRY, August, 1959, page 26.) Excavation and grading were completed in December.

George A. Fuller Company, New York, N.Y., is the general contractor. American Gypsum will produce wallboard, lath, and plaster board in the new facility.

● Plans have been announced for the meeting of the board of directors, National Limestone Institute, Inc., which is to be held on June 13 and 14 in Chicago. Headquarters will be the Edgewater Beach Hotel.

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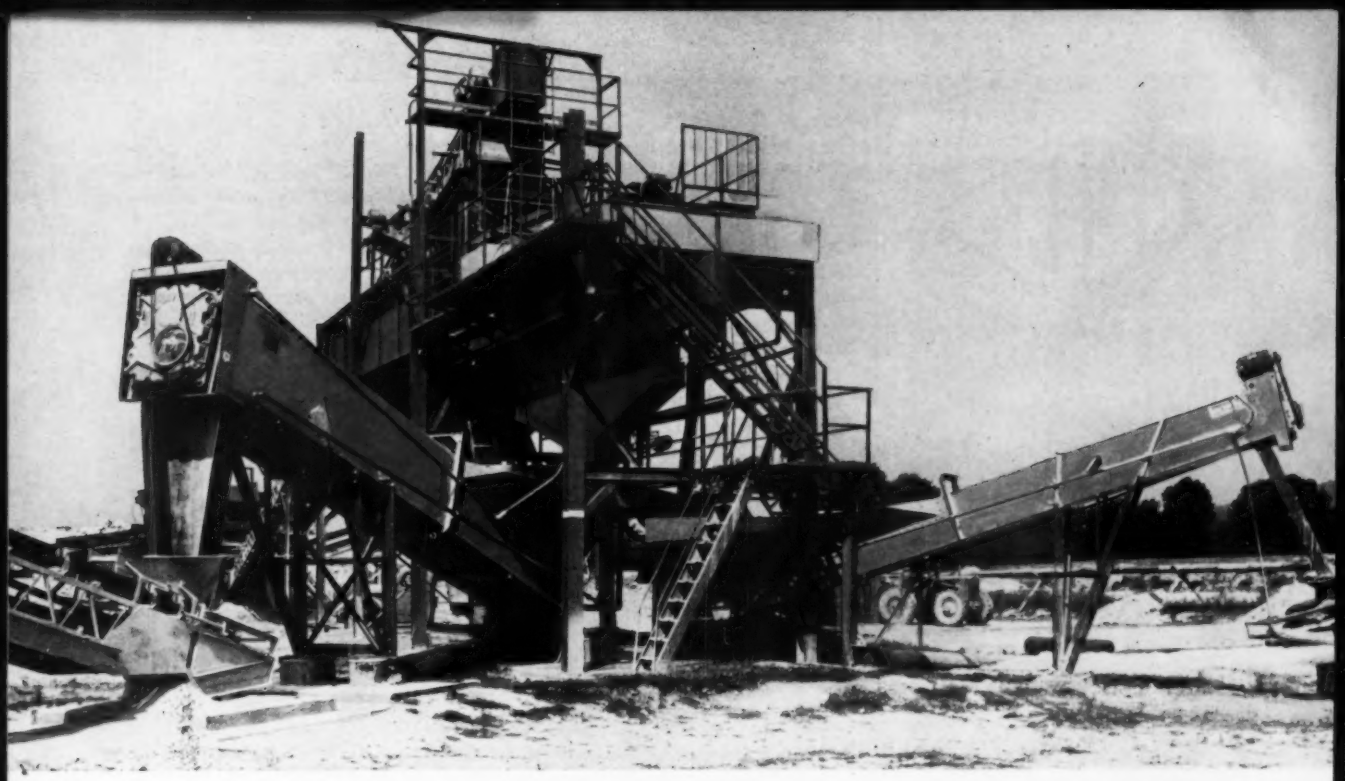

"We are having very good results with our EAGLE EQUIPMENT"—MOUNT CYDONIA SAND CO., INC., FAYETTEVILLE, PA.

Wherever sand is being processed, it's the same story—owners of Eagle Equipment are effusive in their praise because Eagle Equipment does the job and makes money for them.

Mount Cydonia Sand Co., Inc., is typical—an Eagle Sand Washing - Classifying - Dehydrating Section is economically turning out materials that meet Pennsylvania state specifications for concrete sand.

It doesn't take a Philadelphia lawyer to run an Eagle Sand Section—Eagle's field engineers and factory-trained representatives help producers to trim their washers or washing sections so that they can meet local specifications and operate at a profit.

Mount Cydonia's Eagle Section consists of a 20′ Water Scalping-Classifying Tank with 3-cell Collecting-Blending Flume, a 36″ dia. x 25′ Single Screw Fine Material Washer - Classifier - Dehydrator and a 22″ dia. x 25′ Fine Material Screw, each handling a different gradation. Get the facts—ask for Catalog 58.

Increase production with an EAGLE "SWINTEK" DREDGING LADDER

Traveling chain on ladder passes over intake—acts as screen to keep out boulders and stumps. Cutter bars on chain agitate deposit—increase intake of solids and cut through any clay strata encountered. "Swintek", shown on dredge of Rock River Ready Mix Co., Dixon, Ill., is 10″-50′ Heavy Duty model. Send for Catalog 83.

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Internal Revenue Service Issues New Regulations On Natural Resources

T.D. 6446, the long awaited regulations on income tax deductions affecting the nonmetallic minerals industry and other natural resources fields, was recently signed by Dana Latham, commissioner of internal revenue, and released by the U. S. Treasury Department.

These regulations pertain to taxable years beginning after December 31, 1953, and ending after August 16, 1954, and deal with sections 611 to 616 (inclusive) and section 621 of the Internal Revenue Code of 1954. They were first proposed on November 3, 1956, and in the intervening three years have been the subject of considerable discussion between industry representatives and personnel in the Internal Revenue Service.

Further consideration will be given, however, to certain sections among those enumerated above. Final action has been reserved by the Treasury Department on Section 1.612-4 (relating to intangible drilling and development costs); paragraphs (b), (c), and (d) of section 1.613-3 (concerning gross income from mining); and sections 1.614-1 through 1.614-4, which relate to the definition of property.

Lehigh Univ. Receives Bequest Specified in Producer's Will

A bequest of $7,500 was granted Lehigh University of Bethlehem, Pa., by the late John H. Schmidt, former president and chairman of the board of North Jersey Quarry Company, Morristown, N.J., who died in February, 1959. The bequest will be used to establish an unrestricted endowment fund to improve the quality of higher education. Mr. Schmidt was a graduate of Lehigh.

Mr. Schmidt was instrumental in the growth of the firm that his father founded in 1904. In 1956 it was purchased by Houdaille Industries, Buffalo, N. Y. and is now Houdaille Construction Materials, Inc.

Lime Sales in November, 1959

Domestic sales of open-market lime in November, 1959—824,579 short tons—increased over the previous month's output, according to reports by producers to the United States Bureau of Mines.

Refractory and chemical lime increased whereas a decrease was noted in agricultural and construction lime.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1958-59, by Types and Major Uses in Short Tons

	October	November		January-November	
	1959[2]	1959	1958	1959[2]	1958
By types:					
Quicklime	495,333	670,267	533,748	6,419,650	5,267,924
Hydrated lime	185,851	154,312	158,955	1,889,563	1,749,519
Total	681,184	824,579	692,703	8,309,213	7,017,443
By uses:					
Agricultural:					
Quicklime	4,219	2,851	3,619	59,875	49,999
Hydrated lime	5,578	2,968	5,332	96,897	111,339
Total	9,797	5,819	8,951	156,772	161,338
Construction:					
Quicklime	30,135	6,696	12,655	152,991	124,105
Hydrated lime	89,142	68,349	77,208	910,395	853,437
Total	119,277	75,045	89,863	1,063,386	977,542
Chemical and other industrial:					
Quicklime	401,513	472,981	349,778	4,492,554	3,584,657
Hydrated lime	91,131	82,995	76,415	882,271	784,743
Total	492,644	555,976	426,193	5,374,825	4,369,400
Refractory dead-burned dolomite	59,466	187,739	167,696	1,714,230	1,509,163

[1]Also includes a quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

[2]Revised figures (except refractory lime).

Big Storage Area Readied In Griesemer Mine— New Firm to Be in Charge

An underground storage facility of 125,000 sq. ft. in the Griesemer Stone Company, east of Springfield, Mo., on U. S. Highway 66, is expected to be ready for use late this spring.

The facility will be built and operated by a new firm, Security Terminals, Inc., headed by Joseph J. Griesemer, owner of the original firm.

John W. Miller, a company official, said that immediate plans call for using only about one-fourth of the 500,000 sq. ft. available for underground storage. He added that the storage area will have temperature and humidity controls. The ceiling will be 24 ft. above the floor, and will be overlaid by 25 ft. of limestone and 15 to 20 ft. of overburden.

A 4,000-ft. spur, with 570 ft. under ground, will be built by the St. Louis-San Francisco Railroad.

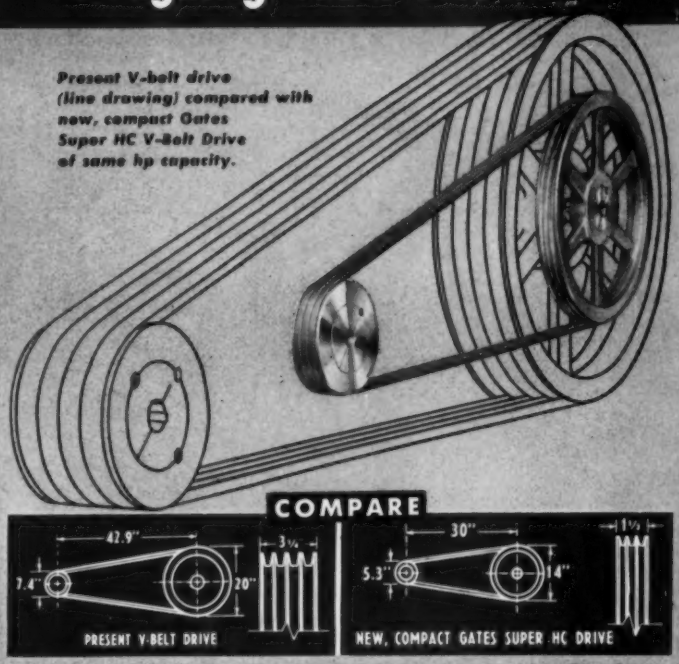
Griesemer's quarrying operations will be continued in another part of the mine. Storage space will be leased to individuals, as well as to the government.

'59 Fluorspar Output Dips— Imports, Consumption Rise

Fluorspar output in the United States during 1959 declined for the second consecutive year, according to preliminary reports, but imports continued to increase. Production estimated at nearly 180,000 short tons, the industry's lowest rate in 21 years, was valued at approximately $8.4 million, according to the U. S. Bureau of Mines.

Government purchase programs had helped to sustain the volume of domestic output in 1958, but were terminated on December 31, 1958. Shipments of metallurgical-grade fluorspar from domestic mines and mills were further curtailed by a lengthy strike at steel plants. Although ceramic-grade shipments increased in 1959, a strike at glass plants reduced demand for this product during a part of the year. Consumption in 1959, though showing a substantial gain over the previous year, was similarly affected by these two labor disputes, particularly the steel strike.

Designing NEW DRIVES?



Save up to 20%

with new high capacity V-belt drive

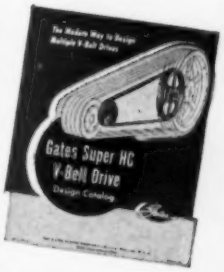
When you change the whole drive—both V-belts and sheaves—remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.



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TPA 437

Gates SUPER HC V-BELT Drives

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Two 4½ cubic yard P&H Model 1400 Electric Shovels owned by Marquette Cement Manufacturing Company, Chicago, Illinois are shown here loading hard limestone at the Marquette Cement Plant and Limestone Quarries near Oglesby, Illinois.

One P&H always sells another...

At MARQUETTE CEMENT COMPANY P&H "Profit·Tons" reduce loading costs all day... every day

Up to 10% more production, lower loading cost per ton and more net profit are the reasons why mining operators the world over are standardizing on P&H Electric Shovels. Actual job reports from P&H owners indicate that up to 30% higher bail pull maintains a more uniform dipper speed for faster filling in difficult digging. Also, greater job availability and the exceptional physical strength of P&H welded alloy construction are responsible for this outstanding performance.

P&H "Profit-Tons" are the end product of these exclusive P&H design principles:

MAGNETORQUE® puts more material into the dipper—faster—with every pass! It's the most productive digging motion drive known for electric shovels. This patented P&H drive electro-magnetically transmits the full digging power of an A.C. hoist motor direct to the dipper without motor generator set conversion to D.C. current. It gives higher bail pull, greater dipper fill factor and automatic impact protection to the digging machinery.

ELECTRONIC CONTROL . . . this patented P&H control accomplishes the quickest work motion reaction time known on electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

In addition, with P&H—and only with P&H—do you get the service assurance of single source responsibility. P&H manufactures their own electrical as well as mechanical components—designed specifically for electric shovel service. Write Dept. 500A, Construction & Mining Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

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P&H

P&H LINE:

Electric Excavators: 3½ through 10 yds.
Diesel Excavators: ½ through 3½ yds.
Truck Cranes: 10 through 80 tons

P&H equipment is also manufactured in Australia, Brazil, Canada, Germany and Japan.

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Death of Wallace E. Wing Of Marblehead Lime Co. Loss to Lime Industry

Wallace E. Wing, chairman of the board of the Marblehead Lime Company, Chicago, died on February 19 at a hospital in that city.

Mr. Wing had been associated with

Wallace Wing

Marblehead since 1922. He was elected president of the firm in 1944 and board chairman in 1956. Marblehead is now a subsidiary of Material Service.

Nationally known in the lime industry, Mr. Wing served as president of the National Lime Association from 1948 to 1951, and was a member of its board of directors and executive committee. He was also a member of the American Society for Testing Materials and the American Chemical Society.

P.C.A. Departments Merged To Form New Paving Bureau

The merger of its Highway and Municipal and Soil-Cement bureaus into a single Paving Bureau in Chicago has been announced by the Portland Cement Association.

Gordon K. Ray, former manager of the Highways and Municipal Bureau, has been named manager of the newly created setup, which will be responsible for providing engineering service and developing technical and promotional information on both concrete and soil-cement.

Integration of the two bureaus will result in better co-ordination and concentration of effort and will provide even better service to design and construction personnel and others in the paving field.

Illinois Limestone Deposits Bought by Medusa Portland Co.

Medusa Portland Cement Company recently purchased options on 470 acres of limestone deposits in Pulaski County in southern Illinois. The purchase was made through a subsidiary, Crescent Stone Company, Cleveland, Ohio, at a reported cost of $82,700.

The company is expected to buy options on an additional 1,000 acres in the near future. Options on about 1,500 acres were taken in 1959.

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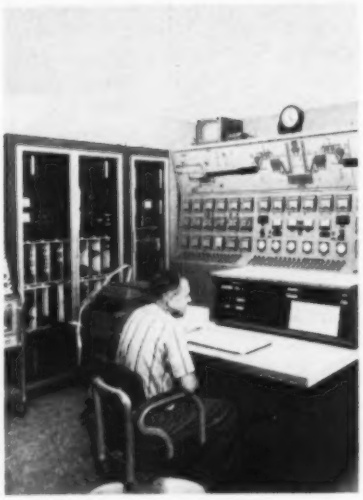
Our Cover Picture



● The cover picture this month shows what is believed to be the first electronic computer permanently installed in a cement plant to control operations. This installation, in controlling a new $5,500,000 raw material storage, blending, and reclaiming system and two new kilns at the Oro Grande, Calif., plant of the Riverside Cement Company, and also a detailed article on its operation, appears in this issue. (For this picture, everything in the control room was rearranged, so that all components would show.) In the background is the semi-graphic console cabinet from which the new kilns are controlled, with television monitors above. The operator is seated at the computer desk, the computer itself being against the wall at the left. At the far left is the test device (on wheels) for checking computer operation. At the operator's left is the Flexowriter, which prepares information on punched tape to be fed into the computer.

Evans, Coleman & Evans Building Automated Plant At Vancouver Site

Construction began recently on an aggregate plant for Evans, Coleman & Evans Limited at Mary Hill in the Lower Fraser Valley, Vancouver, B. C., to replace an existing facility at the site. Total expenditures are estimated at $1,500,000. The plant is scheduled to be completed in July.

The new plant will be a highly automated operation with an input capacity of 600 t.p.h., and barge-loading facilities capable of handling 1,500 t.p.h. Western-Knapp Engineering Company of San Francisco and Chicago was commissioned to carry out all engineering.

All equipment is reportedly already on order, in transit, or on site. Canadian, American, and British suppliers are being utilized. The list includes crusher, screens, sand classifying tanks, motors, dewatering screws, conveyors, feeders, and controls. Utilizing specially designed electronic equipment, one man will control all blending and loading operations.

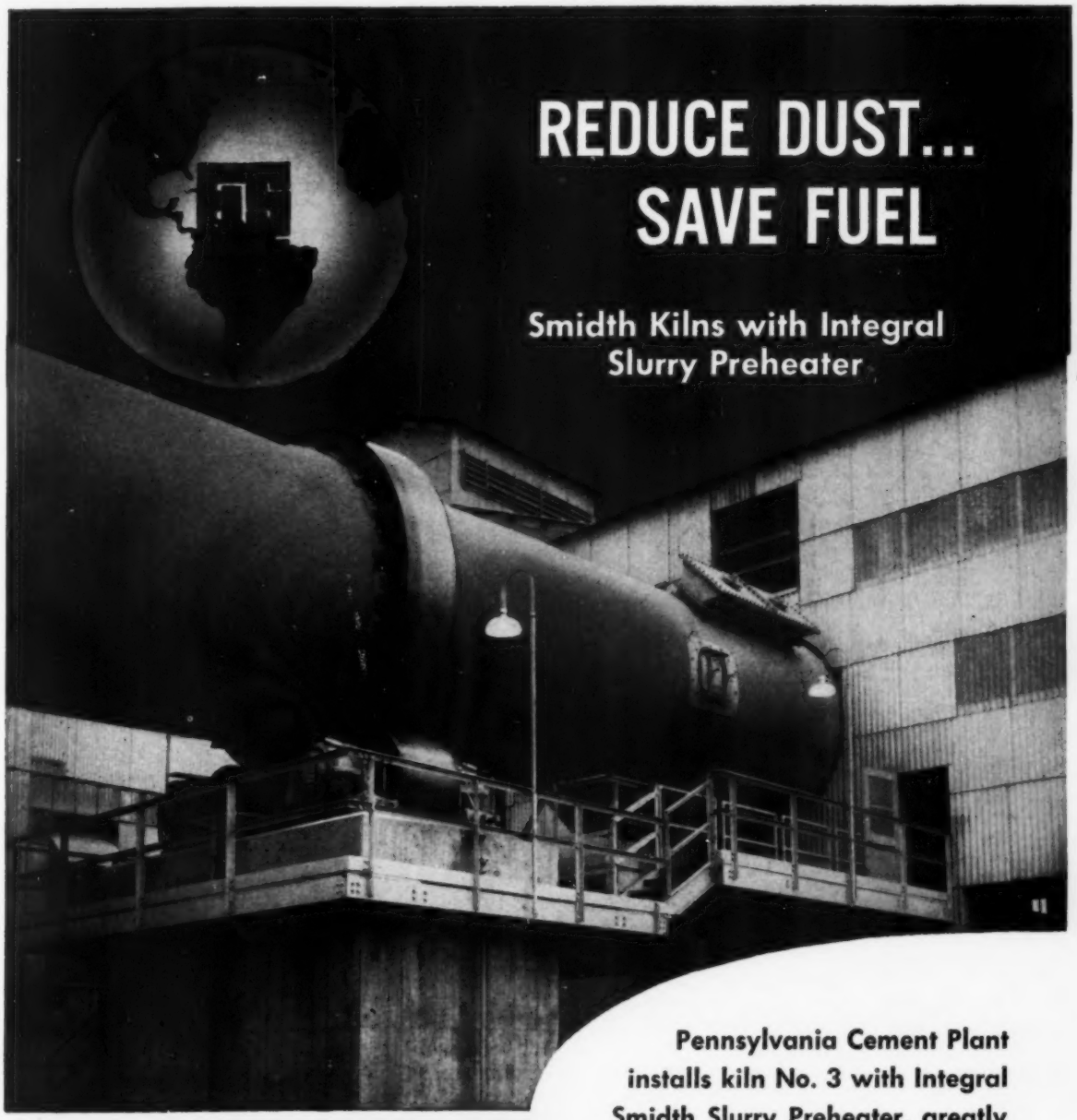
The site is located on the banks of Pitt River near its confluence with the Fraser in the heart of the Lower Mainland area. Ample barge and highway trucking facilities are already in place.

A.S.C.E. Convention Program To Feature Water Problems

The national convention program of the American Society of Civil Engineers, set for the Jung Hotel, New Orleans, on March 7-11, will feature civil engineering problems about water, its control, and drainage. More than 1,500 engineers from all parts of the country are expected at the meeting.

There will be 28 technical sessions during the five-day convention. More than 100 papers and speeches have been scheduled.

In other areas of civil engineering activity, 13 technical papers will be presented by the Structural Division, and ten at the Soil Mechanics and Foundations Division. Seven papers are scheduled for the Construction and seven for the Pipeline Division. In all, ten of the society's divisions will sponsor sessions.



REDUCE DUST... SAVE FUEL

Smidth Kilns with Integral Slurry Preheater

Pennsylvania Cement Plant installs kiln No. 3 with Integral Smidth Slurry Preheater, greatly reducing dust loss and fuel consumption.

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42 Queen's Road
Bombay, India

Preliminary Report Shows Record 1959 Production Of Crushed, Broken Stone

Crushed and broken stone production in 1959 was approximately 575 million tons, exceeding the former peak of 533 million tons established in 1958. This record-breaking production was attained despite reduced highway funds available for use in some states, slowdowns resulting from the steel strike, and difficult home financing in many areas, according to preliminary reports received by the U.S. Bureau of Mines.

Increased demand for concrete and roadstone under the program of the Federal Highway Act of 1958 and renewed homebuilding activity offset reduced sales for industrial applications. Fluctuations were noted in crushed stone output from state to state, and sales tended to be slightly below the level of construction activity.

Over half the crushed and broken stone went into concrete and roadstone applications in 1959. Nearly 90 percent of the aggregates produced for these purposes came from commercial operations. Limestone, including dolomite, accounted for about three-fourths of the total output. Stone was used in almost every phase of construction and in many industrial applications.

As in previous years, production included crushed stone used for concrete aggregate, roadstone, cement, lime, metallurgical flux, railroad ballast, refractory stone, agricultural limestone, abrasives, and riprap, and in various chemical and other manufacturing processes.

Dust Removal System Ordered for Hercules Plant

Fiberglas bag filters of the latest type for dust removal will be installed at the Stockertown (Pa.) plant of the Hercules Cement Company, according to company officials.

David P. Griffith, Hercules vice-president, operations, stated that the American Cement Corporation directors (parent company) had approved a $1,000,000 allocation for the system on the three large kilns at Stockertown.

John G. Hoad & Associates, consulting engineers, Ypsilanti, Mich., have completed an engineering survey and the design for the project. Work on the installation will be started this summer.

The Stockertown plant of Hercules is one of the most modern in the Lehigh Valley area; it has a capacity of 3,500,000 bbl. per year.

J. H. Robinson

J. H. Robinson Leaves Staff Of Gypsum Lime & Alabastine

J. H. Robinson, formerly executive vice-president of Gypsum Lime & Alabastine Company, Toronto, has retired from this post, and will head the firm of J. H. Robinson & Associates, consulting engineers in that city.

Mr. Robinson had been associated with the Canadian firm for nearly 38 years, and previously had served on the staff of the U. S. Gypsum Company at Genoa, Ohio.

He will retain a connection with Gypsum Lime & Alabastine for about four years, in the capacity of a consultant; but he will also do consulting work in Canada and elsewhere.

WILLIAM F. STEVENS, 70, who was associated with the California Portland Cement Company for over 30 years, retiring in 1956 as assistant sales manager, died recently in Los Angeles.

U.S. Building Contracts Show 3% Gain in 1959— Continuing Upward Trend

Sharp gains in contracts for housing and for industrial and commercial buildings in 1959 sent construction to a new all-time high for the 13th year in a row, according to a year-end review of construction contracts published in *Building Business*, monthly bulletin of F. W. Dodge Corporation.

Total construction contracts in the United States (excluding Alaska and Hawaii) in 1959 amounted to $36,269,000,000, a gain of 3 percent over 1958.

The following highlights are mentioned:

Residential contracts were at record levels and accounted for the bulk of the increase in total construction contracts. Apartment buildings continued to play a large role, making up 17 percent of the dwelling units represented by the residential contracts.

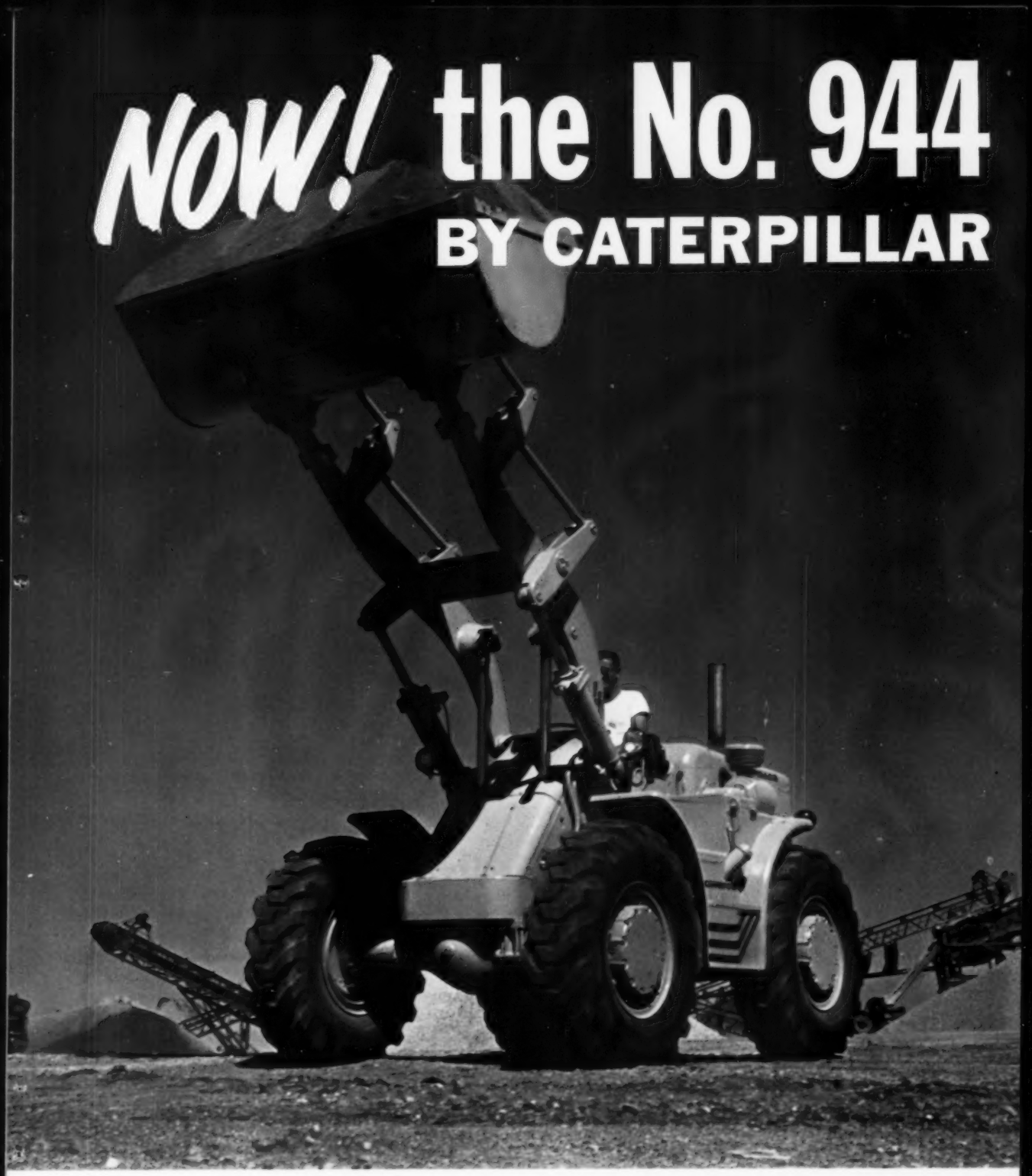
Contracts for industrial buildings rebounded sharply from the recession lows of 1958, rising 34 percent. Prospects are excellent for a continuation of this trend.

Commercial building contracts were also at high levels throughout 1959. Stores and other mercantile buildings sparked the gain, but office building contracts dropped 4 percent below the 1958 total.

Highway contracts declined sharply, falling about $1 billion below the record 1958 level. Some declines from the recession-induced 1958 level were expected. In addition, however, cutbacks were made in the Federal Highway Program, due to shortages in the Highway Trust Fund.

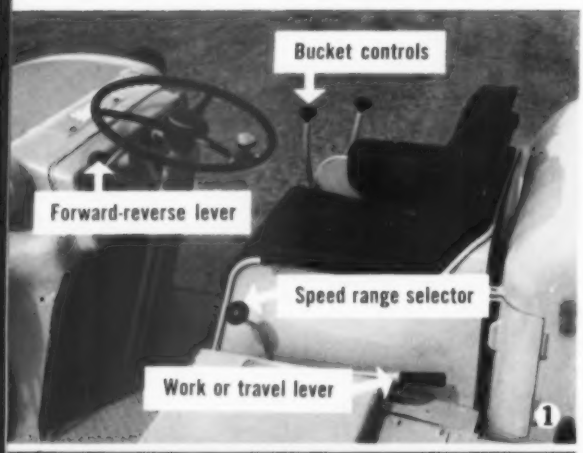
Educational buildings registered their first notable drop in the postwar period, falling 8 percent below the 1958 level.

Details of Dodge construction contract figures not ordinarily made public were released in the review, which pointed out that the 1959 gains were wholly accounted for by a sharp upsurge in the private sector of construction. Private-ownership projects rose 16 percent above the 1958 level, but public projects were actually down 18 percent.



THE *FIRST*
OF A NEW WHEEL LOADER LINE

the No. 944 ...designed for action,



IT'S HERE . . . the Cat No. 944 . . . rated at 2 cu. yd. capacity . . . the first of a completely new line of equipment that will soon include the No. 922 (1¼ cu. yd. bucket) and the No. 966 (2½ cu. yd. bucket).

Watch for these new machines with the bold new design . . . they're ready to bring new standards to wheel loader operation.

Take a look at the No. 944's big, new features . . . features that give it lively response and make it the easiest and safest wheel loader to operate. See it in action at your Caterpillar Dealer. Ask him for a demonstration. See for yourself how the *new design* pays off on your loader jobs.

DESIGNED FOR ACTION . . . with plenty of power for both machine drive *and* bucket hydraulics. Choose from two great, new engines . . . the compact 4-cylinder diesel, turbocharged for maximum efficiency . . . or the 6-cylinder gasoline engine. Both are 105 HP units, fully equipped. Both are made to the same rigid standards. Whatever the requirements of your operation, there's a No. 944 powered to meet your needs.

Tailored to this power is the torque converter and power shift transmission, providing smooth, instant, finger-tip shifting. A full range of work and travel speeds is available on the No. 944. And reverse speeds are 25% faster than forward speeds . . . important in reducing cycle times. Travel Range gives 2-wheel drive for roading . . . Work Range automatically puts power to all 4 wheels.

Machine and bucket controls are located for easy handling(**1**) —the forward-reverse lever is mounted on the steering column.

Both bucket control levers have kick-out devices. The lift control releases at dumping height—the tilt control positions the bucket for digging. And for full bucket loads every pass the 2 cu. yd. bucket tilts back 41° at ground level. The high lift and *extra-long reach* make truck loading faster, easier.

There's plenty of action designed into the No. 944, ready to speed up your loader jobs.

DESIGNED FOR SAFETY . . . in the bold new lines(**2**). Bucket lift arms and pivot points are completely in front of the operator's area. This gives the operator new freedom of movement . . . greater all-around visibility.

Wide steps(**3**) make it safe and easy to get on or off . . . from either side. No need to climb over tires. Fenders provide a handy platform for checking the engine and they protect the operator from rocks and mud(**4**).

The No. 944 brake system gives safer, more precise control(**5**). The *left* brake neutralizes the transmission *as* it stops the machine. This gives superior loading action in extra-tough material.

Traxcavator safety, economy

The *right* brake leaves the transmission engaged . . . for full control when creeping, working on steep slopes or roading downhill.

These and other safety-bonus features give the No. 944 operator greater confidence, greater efficiency.

DESIGNED FOR ECONOMY . . . in the Caterpillar tradition. Sound engineering, modern design, service accessibility, quality construction, responsible parts and service coverage all add up to a new kind of stability—mechanical stability—in the No. 944. The many cost-saving features of this NEW wheel loader will pay off big in your operation!

Offered in a full line of versatile attachments and accessories are forks, cab(**6**) and special buckets, including the *exclusive side dump* that gives the No. 944 added efficiency.

BRIEF SPECIFICATIONS

Horsepower (Net)	105*
Bucket capacity	2 cu. yd.
Bucket reach (@ 7 ft. dump height)	50¾ in.
Over-all width (bucket)	93½ in.
Wheel base	88 in.
Speeds, forward (4)	0-24 MPH
reverse (4)	0-30 MPH
Weight, shipping (with diesel engine)	20,780 lb.
(with gasoline engine)	20,440 lb.

* For comparative purposes, the maximum rating of the D330 Engine used in the No. 944 is 135 horsepower.

6

THE No. 944 TRAXCAVATOR...

NEW IN DESIGN AND
LOADED WITH PERFORMANCE

Learn more about it. Visit your Caterpillar Dealer the week of March 14

There's a wealth of LOADER KNOW-HOW behind the No. 944. It comes from the builders of the best accepted track-type tractor-shovels in the field.

Every feature is designed for *efficient work*. Plenty of horsepower . . . finger-tip shifting . . . smooth, fast bucket action . . . outstanding operator comfort and safety. The result is the bold, new No. 944 . . . the *outstanding* performer in its class!

For complete facts, see your Caterpillar Dealer now.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

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EARTHMOVING EQUIPMENT

A GREAT NEW PRODUCT IN THE CATERPILLAR TRADITION

Marine Operations Dept. Formed by Ideal Cement As Ship Facilities Grow

With the purchase of the 84,000-bbl. capacity ship *SS. Keva Ideal*, for the transportation of cement and other materials, management of Ideal Cement Company has decided that the firm's marine operations have grown to such an extent as to require the establishment of a Marine Operations Department.

N. A. Nicolson has been named manager of the new department, with offices to be located in Mobile, Ala. He will be in charge of the *Keva Ideal* and will also supervise the operation of all marine equipment—tugs and barges—on the Gulf and Pacific Coasts.

The *S.S. Cornell*, a large T-2 type (14,000-long-ton capacity) oil tanker, is being refitted by Ideal Cement Company to carry cement limestone, gypsum, and other products from its Redwood City, Calif., plant to West Coast destinations.

When it is put into service, it will rank with the largest ships that have used the port of Redwood City. The tanker, to be rechristened, will travel to Ideal's Sacramento terminal, and to the new Vancouver, Wash., terminal, which is still being constructed. The latter, when in full operation, will be Ideal's main terminal on the West Coast. Presently Ideal ships cement to Sacramento and Richmond by barge.

Two Beu Enterprises Sold To American-Marietta Co.

American-Marietta Company has purchased the quarries, stone crushing facilities, and sand and gravel plant of Beu and Sons Company, and Beu Limestone Company of Grundy Center, Iowa. The former Beu companies will become a part of the Concrete Materials and Construction Division of A-M.

The Beu firms were started in 1927, and presently consist of approximately 20 material sources, both leased and owned. Facilities include a sand and gravel plant, a stationary stone crushing plant, and two portable stone crushing plants. Present personnel will continue the direction of operations as a part of the A-M division.

● Two of the 16,000 celebrants at the "thank you" demonstration staged by the residents of Escanaba, Mich., in honor of Harnischfeger Corporation dealer representatives and executives. Henry Harnischfeger (left), president of the crane and excavator firm, meets "Big Ole," portrayed by Robert Vietzke, during the festivities. The Michigan city put on the affair to show its gratitude to the equipment firm, which launched an industry in Escanaba 12 years ago and changed the community from a depression-ridden town into an extremely prosperous one.

4th Edition of Safety Manual Issued by Safety Council

Publication of an *Accident Prevention Manual for Industrial Operations*, the 1,542-page fourth edition of a National Safety Council book is described as the most complete and informative safety reference work in existence.

The completely revised fourth edition contains 200 additional pages of new information. Compiled, edited and reviewed by safety authorities in their fields, the manual has 500 illustrations and data on every aspect of industrial safety.

Subjects covered in the manual include accident investigation, analysis, and costs; plant construction and maintenance; handling and storage of materials; power trucks and tractors; ropes, chains, and slings; hand and portable power tools; flammable liquids; personal protective equipment; medical, nursing and first-aid services in industry; and a table of chemical hazards.

Price, $15.50 for single copies, $14.75 for two to nine copies, $14 in quantities of 10-99, and $13.20 for 100 or more. Published by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Preliminary Report Issued On '59 Sand-Gravel Output Shows All-Time High

According to preliminary reports of producers to the U. S. Bureau of Mines, production of sand and gravel in 1959 paralleled the national construction trend and reached al all-time high, surpassing the record 680,000,000-ton output of 1958. A few states showed decreases in production, although the majority registered moderate gains. The extended steel strike adversely affected the sales of industrial sand.

Increased consumption of sand and gravel was attributed to greater highway construction activity and to private and public construction resulting from continued urban and industrial expansion.

The increase in the use of portable plants continued in many areas. These mobile plants normally operate outside the economic transportation limits of stationary plants.

Truck haulage continued its increase in transportation; more than 85 percent of the total U. S. sand and gravel production is hauled by this method.

Shortages of aggregates in several states spurred intensive investigations of new supply sources and technological improvements in processing methods and plant design.

Victor Chemical Orders Kiln For Nodulized Phosphate Rock

Victor Chemical Works has retained Meissner Engineers, Inc., of Chicago, to design the raw materials handling and feed system for a new kiln to produce nodulized phosphate rock, to augment the two present kilns at it Mt. Pleasant, Tenn., plant. Foster-Creighton Company has been named the contractor.

Included in the project are the new kiln; cooling, crushing, and screening facilities; a scrubbing tower; a dust collection system; and a clarifying tank.

Soconusco Quarries and Development Company, Ltd., has started on the construction of a cement plant eight miles from Port-of-Spain, Trinidad. The plant will have an annual capacity of 200,000 tons and will be worth about $5,800,000 (U. S.)

Lightweight Producers Hopeful At E.C.S.A. Annual Meeting

ELECTION of officers, selection of Detroit, Mich., as the place for its mid-year meeting in July, and a prediction that the decade between 1960 and 1970 will bring an increase of 2 to 2½ times the present use of lightweight aggregates—these were high lights of the annual meeting of the Expanded Clay and Shale Association, Inc., held at Roanoke, Va., on January 28 and 29. Forty men were in attendance from 14 states.

Re-elected as officers of the association for the 1960 year were: president, R. G. Hardy (general manager, Onondaga Brick Corporation, Syracuse, N. Y.); vice-president, Melvin Cruzen (general manager, Light Weight Aggregate Corporation, Livonia, Mich.); and secretary-treasurer, D. M. Groves (vice-president, of Shalite Corporation, Knoxville, Tenn.). They will serve until the annual meeting in 1961.

The association accepted the invitation of Light Weight Aggregate Corp. to hold its mid-year meeting in Detroit, Mich., in July. The date and headquarters site for the meeting will be announced later.

During the two-day session, those attending heard the following addresses: *Research Revelations on Lightweight Aggregate*—Dr. W. C. Bell, North Carolina State College; *Experience with Additive B in the Manufacturing Process for Lightweight Aggregate*—John D. Mitchell, general manager, Western Brick Company's lightweight aggregate division, Danville, Ill.; *Chemical Admixtures for Lightweight Aggregate Construction* — Melville E. Prior, technical services manager, construction chemicals department, W. R. Grace & Company, Dewey & Almy Chemical Division, Cambridge, Mass.

What's Happening in Lightweight Aggregate was the topic of a forum discussion led by B. K. Powers, chairman of the association's Technical Problems Committee. Mr. Powers is vice-president of Virginia Lightweight Aggregate Corporation of Roanoke, which was host to the annual meeting. *The Outlook for Growth of Lightweight Aggregates* was discussed by Melvin Cruzen and William W. Karl, president, Lehigh Materials Company, Tamaqua, Pa.

Dr. Bell described the findings of a two-year sintering project conducted under the industrial experimental program which he heads at the School of Engineering, North Carolina State College, Raleigh. He told of development work done on the clay-bonded lightweight aggregate block, for which he forsees a bright future. Co-ordinated data on such things as thermal expansion and modulus of elasticity are "musts" for design engineers, he said, but this data must be made available.

Mr. Mitchell said his company had been producing aggregate since 1926, and had gone to sintering in 1951. Beginning in 1957, Western Brick utilized Additive B, produced by Kimberly-Clark, in amounts that varied with the raw material, ranging from three quarts to 1½ gal. per cu. yd. The additive is introduced into the water stream in a paddle mixer. Mr. Mitchell said that the additive has been found to impart qualities of elasticity, and increases the formation of pellets that improve the flow on cake. The combustion rate on the raw cake increases with a 15 percent increase in yardage.

Mr. Prior's talk, illustrated with slides, covered the uses of various types of chemical admixtures such as air-entraining agents, water-reducing agents, and initial-retarding agents in lightweight aggregate concrete. He cited case histories in which benefits were gained through the proper application of chemical admixtures, and described actual field work.

B. K. Powers traced the rapid growth of lightweight aggregates, which have a current production estimated at 7,000,000 tons annually, or 7½ times that of 1950. The "dynamic 60's" should see this current figure doubled and better, Mr. Powers said, adding that many architects say lightweight concrete is *the* material to build with because with it "they can be so creative and can control costs."

"The responsibility for doing a good job with lightweight aggregate rests with the producers," W. W. Karl declared. He noted that the use of structural concrete in New York City's metropolitan market has grown tremendously. "Once people are used to handling it, lightweight aggregate comes into its own," Mr. Karl pointed out. "Designers are now pushing for the specification for lightweight aggregate concrete because of its economic advantages." He cited two recent projects in New York, each of which required 40,000 cu. yd. of lightweight concrete.

The importance of developing new markets for lightweight aggregate was stressed by Mel Cruzen. As an example of these new possibilities, he pointed to the increasing acceptance of lightweight aggregate as a soil conditioner. Producers must do a superior job of providing designs and gradation data, plus other technical information for architects, engineers, and contractors, Mr. Cruzen said, adding that sales promotion on a large scale is an investment that can lead to new and hitherto undiscovered fields of use for lightweight aggregate.

President Hardy summed up the three-fold challenge of the lightweight aggregate industry: (1) to make available the most nearly complete data on the advantages of lightweight aggregate; (2) to make a better product at lower cost; and (3) to carry out an effective public relations program to educate all segments of the industry concerning the practical values of lightweight aggregate.

Virginia Lightweight was host on a tour of its Weblite plant on Thursday afternoon. L. E. Pfeiffenberger, the association's technical director, gave an activities report on work of the American Society for Testing Materials and the American Concrete Institute. T. R. Berger, executive secretary, in his semi-annual report said that in the last half of 1959 the industry did not measure up to all of the great expectations; yet it crossed over into 1960 with an exceptionally bright prospect.

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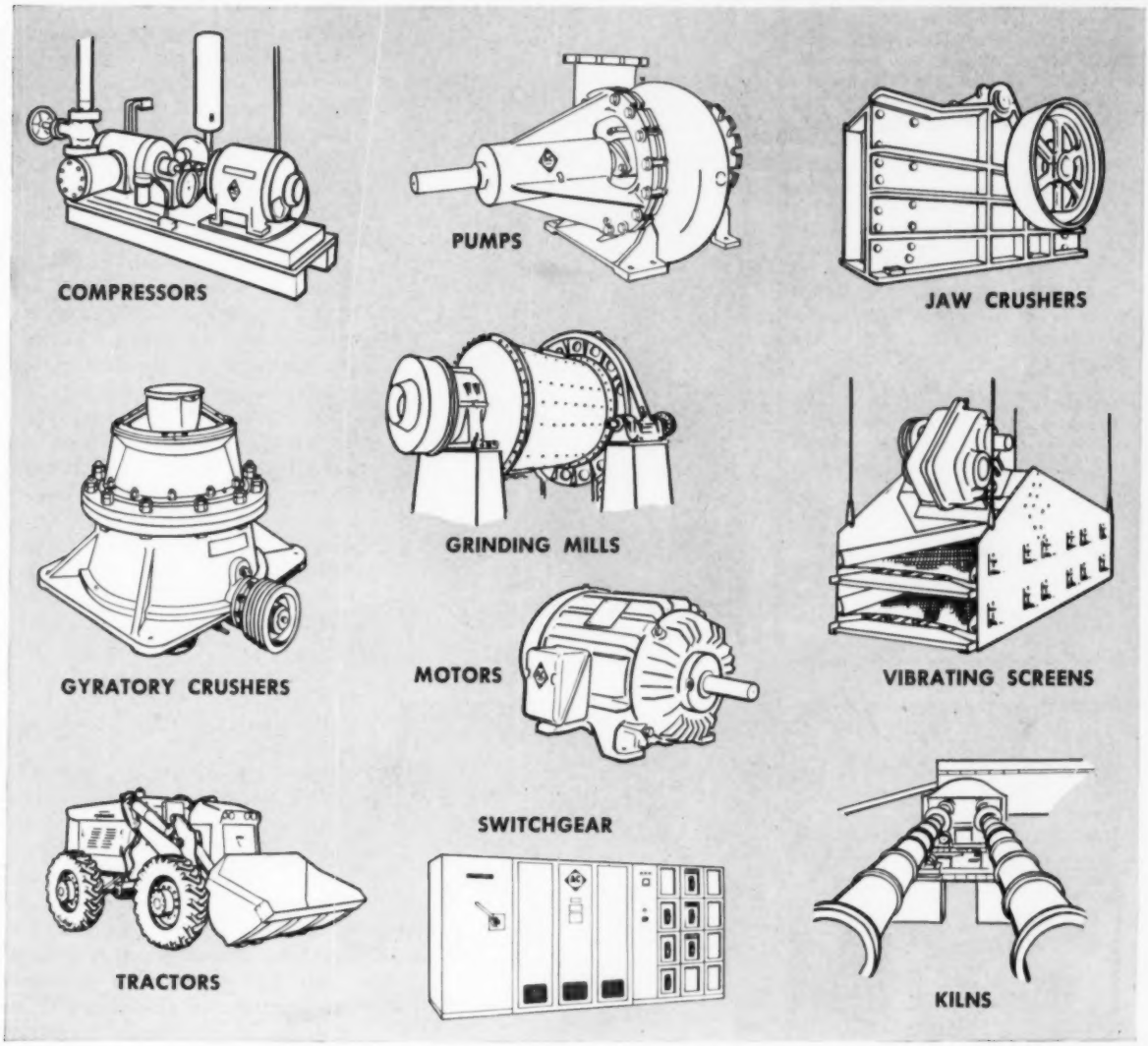

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A-C engineers are uniquely capable of analyzing your entire operation and suggesting methods for improving your plant efficiencies. Fuel consumption, power demands, maintenance — all big profit eaters — are apparent to their cost-cutting eyes. And they don't make "guesstimates" — years of experience in the rock products industries furnish them with a background for accurate appraisal. New and unusual problems are referred immediately for test in Allis-Chalmers laboratories and pilot test plant facilities. A-1239

In addition to the equipment shown above, Allis-Chalmers offers a complete line of processing equipment, related electrical distribution, driver and control equipment, pumps and valves for all fluid-flow problems.

Contact your Allis-Chalmers representative or write ***Allis-Chalmers,*** *Industrial Equipment Division, Milwaukee 1, Wisconsin.*

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SACRIFICE PRICES

Complete contents Gypsum Plant, includes RAYMOND MILLS, 5 roll low side, WILLIAMS CRUSHER, type NF 100 HP motor, LARGE CALCINING KETTLES with heavy duty mixers, oil burners, etc. SCREENS Tyler-Hummer, 2 deck, 4x6 & 3x5, W/Y-16 Vibrators. TRAVELING BUCKET ELEVATOR—Barber-Greene, self propelled on cats w/Buda Engines, CLARK tructractors forward tilt dump buggies, TRAVELING GANTRY CRANE, Level luffing type w/3 yd. bucket. HANDLING BUCKET, 3 yd. cap. Package boiler Cyclotherm, 125 HP, 150 lbs., oil fired. APRON FEEDER PAN CONVEYOR. TROUGH BELT CONVEYORS. 18x24" widths, MERRICK WEIGHTOGRAPH FEED SCALE. FORK LIFT TRUCK 6000 lbs. cap. RIBBON MIXER, twin trough double arm. BUCKET ELEVATORS, SCREW CONVEYORS, STEEL HOOPPERS & BINS, VIBRATORS, air operated. Motors—pumps—BLOWERS—MG Set-switches—compensators—steel stacks—floor plates—pipe, valves, fittings, lumber, & other building materials to be dismantled.

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Consumers Div. Realignment Moves Five Into New Posts

A major reorganization of the executive staff of Vulcan Materials Company's Consumers Division, Chicago building materials producer, has been announced by Charles W. Ireland, board chairman of Vulcan and president of Consumers Division. Mr. Ireland is relinquishing the latter post, and has named William A. Brown Jr. as the new president of the division and executive vice-president of the parent organization. Mr. Brown has resigned as vice-president of the Alemite Division of Stewart Warner.

W. A. Brown Jr.

In announcing this and other executive changes, Mr. Ireland revealed that a new Transportation Division has been set up to serve local Vulcan operations. It will be headed by John J. Gates, Buffalo, N. Y., building materials executive as president, and William C. Schlegel, presently vice-president of the company's concrete division.

Mr. Ireland also announced that Raymond W. McCall has been appointed assistant to Clay Lambert, Consumers operating vice-president, who was previously a project manager on the St. Lawrence Seaway project.

Foster M. Wells, well-known design engineer who aided in preparatory planning of the Illinois Toll Roads, is manager of the new Dept. of Engineering Services.

Prior to his service at Alemite, Mr. Brown served as president of Liquid Carbonic Corporation from 1951 to 1956.

Mr. Gates has been a New York building materials executive for 20 years. Most recently, he has been vice-president and general manager of Buffalo Crushed Stone Corporation, a Houdaille Industries division.

Mr. Schlegel has been an operating executive of Consumers Company and its predecessor companies for nearly 30 years and has been a pioneer in developing ready-mix concrete facilities in Chicago. He has most recently filled the post of vice-president of the Consumers concrete division.

• Correction

It has been brought to our attention that the item reporting the Victor J. Azbe Lime Award Contest (PIT AND QUARRY, January 1960, page 37) carried a misleading implication. The $1,000 annual award will be given by Victor J. Azbe; however, the National Lime Association will sponsor the competition.

ANALYZE FOR Na_2O or K_2O WITH ACCURACY IN ONE MINUTE

In analyses for alkalies, such as sodium and potassium oxides under ASTM Spec. C114-51T, the Perkin-Elmer Model 146 Flame Photometer delivers reliable results. Internal standard or direct-intensity reading from AC drift-free electronics gives fast routine analyses, accurate to within one percent.

The Model 146 operates with any commercially-available gas and air, is designed for simplified, convenient operation. It uses regular electric utilities, and includes rugged self-contained meter and phototube circuits.

Write for Perkin-Elmer's illustrated brochure on the Model 146 Flame Photometer.

INSTRUMENT DIVISION
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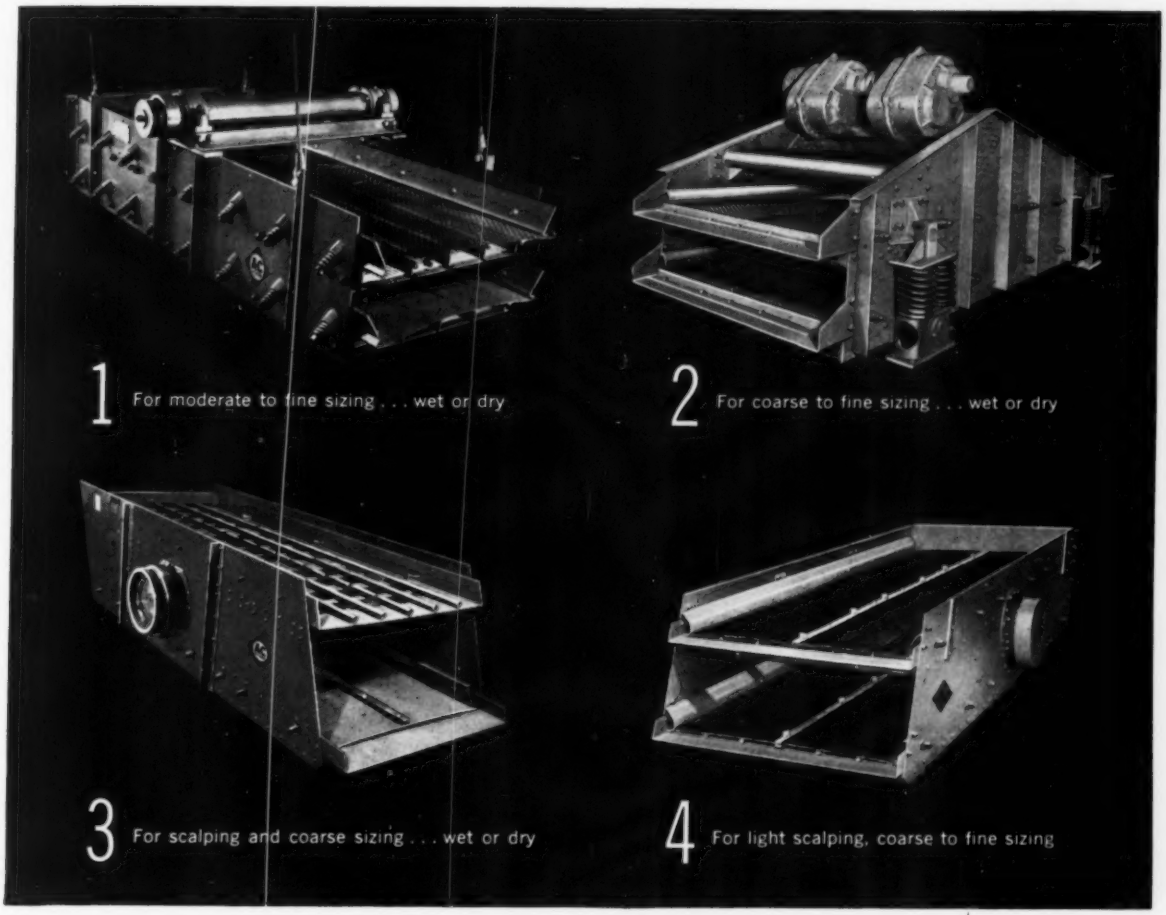
1 For moderate to fine sizing . . . wet or dry
2 For coarse to fine sizing . . . wet or dry
3 For scalping and coarse sizing . . . wet or dry
4 For light scalping, coarse to fine sizing

Pick a screen to fit your job

. . . be it scalping, sizing, rinsing, washing, or heavy media recovery

Large or small capacity — wet or dry crushed stone, sand or gravel — whatever your application there's an A-C screen for the job. Building the industry's most complete line of horizontal and inclined screens, Allis-Chalmers gives unbiased recommendations — suggesting to you the screen that will do your job at the lowest possible cost consistent with quality.

Built for a beating: There's no skimping on quality at A-C. For example, the frames of Allis-Chalmers screens are carefully machined and *stress relieved* for years of tough usage.

Easy to choose: A helpful screen selection guide has been prepared to help you pick the right model screen for your process. *Contact your Allis-Chalmers representative or write for Bulletin 25B6280. Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada write Canadian Allis-Chalmers, Ltd., Box 37, Montreal, Quebec.*

1 **For moderate to fine sizing** — wet or dry. AVS *Aero-Vibe* inclined screen: Available with wire cloth or perforated plate surfaces. Maximum aperture — 1½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 5 by 10 feet.

2 **For coarse to fine sizing** — wet or dry, rinsing, or media recovery. *Low-Head* horizontal screen: Saves headroom. Wire cloth or perforated plate. Apertures to 2½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

3 **For scalping and coarse sizing** — wet or dry. XH *Ripl-Flo* inclined screen: Wire cloth, perforated plate, rod or stepped grizzly-bar surfaces. Apertures to 10 inches. 1, 2 or 3 decks. Sizes 4 by 8 to 8 by 14 feet.

4 **For light scalping, coarse to fine sizing** — wet or dry, and for rinsing. SH *Ripl-Flo* inclined screen: Wire cloth or perforated plate. Apertures to 5 inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

Aero-Vibe, Low-Head and Ripl-Flo are Allis-Chalmers trademarks.

A-1215

Bryan M. Collins

Collins Elected President Of N.B.C.A. at 5th Convention

Bryan M. Collins, president, Collins Construction Company of Texas, Austin, Tex., was elected president of the National Bituminous Concrete Association at the fifth annual convention in Detroit, in February.

Mr. Collins and his father organized the company he heads, an enterprise now 20 years old. He is also president of Colorado Equipment Corporation. In addition, he is an executive of several other concerns and national industrial associations.

Lightweight Aggregate Producer Changes Name to Solite Corp.

The Southern Lightweight Aggregate Corporation of Richmond, Va., will henceforth be known as Solite Corporation. The change has been made for reasons of simplicity, brevity, and product identification. The firm produces Solite lightweight aggregate for use in structural concrete and masonry units.

Solite also recently purchased the two buildings that house their home offices in Richmond. Formed in 1947, the concern currently operates three wholly-owned subsidiaries: Virginia Solite, Carolina Solite, and Florida Solite, with offices in Charlotte, N. C., and Jacksonville, Fla. Plants are located at Bremo Bluff and Leaksville Junction, Va., Aquadale, N. C., and Green Cove Springs, Fla.

Construction Put in Place Sets a New Record Peak For January—$3.7 Billion

The value of new construction put in place in January amounted to $3,700,000,000, a new record high for the month, according to preliminary estimates of the U. S. Department of Commerce. This is down 8 percent from the December level (less than the usual seasonal decline) but up 1 percent from January, 1958.

Items: private construction is running strongly ahead of last year, with a January total of $2,700,000,000—up 6 percent from last January; the 10 percent decline from December is less than the normal seasonal decline. Work on commercial and industrial buildings totaled $757,000,000—up 16 percent.

Items: expenditures for public construction were slightly down at a total of $1,000,000,000—12 percent lower than January, 1958, and 1 percent lower than last December. A 20 percent drop in highway spending was a major cause for the downturn from last January's level.

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CORE DRILL MACHINE

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• COMPACT
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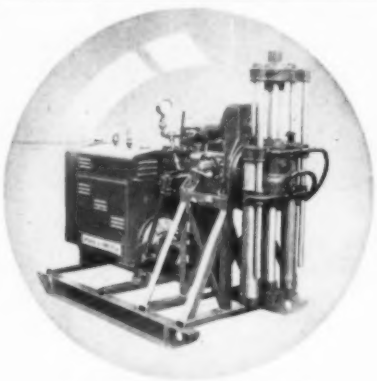

• The ideal machine for foundation investigation and shallow mineral exploration.
• Available with either screwfeed or hydraulic swivelheads with or without built-in water pump and a wide choice of power units.
• Unit can be skid, truck, or trailer mounted.
• The Model 30 is a quality machine produced by a quality manufacturer.

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Record Gypsum Production Reported in 3rd Quarter, 1959

Domestic mine production of crude gypsum during the third quarter of 1959 reached an all-time high for a quarter. Output, as reported to the U. S. Bureau of Mines, totaled 3,042,088 short tons, up 14 percent from the corresponding period of 1958 and 6 percent above the high established in the third quarter of 1955.

Imports during the third quarter of 1959 amounted to 1,890,394 tons—77 percent above those in the previous third quarter. The supply of crude gypsum from mines and imports was 32 percent greater.

Use of uncalcined gypsum products rose 12 percent above the last third quarter, chiefly as the result of a record demand for portland cement retarder. Production of calcined gypsum increased 13 percent to 2,610,786 short tons. Sales of building and industrial plasters were 9 and 21 percent higher, respectively, while manufacture of gypsum boards was up 18 percent from the third quarter of 1958. Sales of gypsum boards set a new quarterly record of 2,450,016,000 sq. ft.

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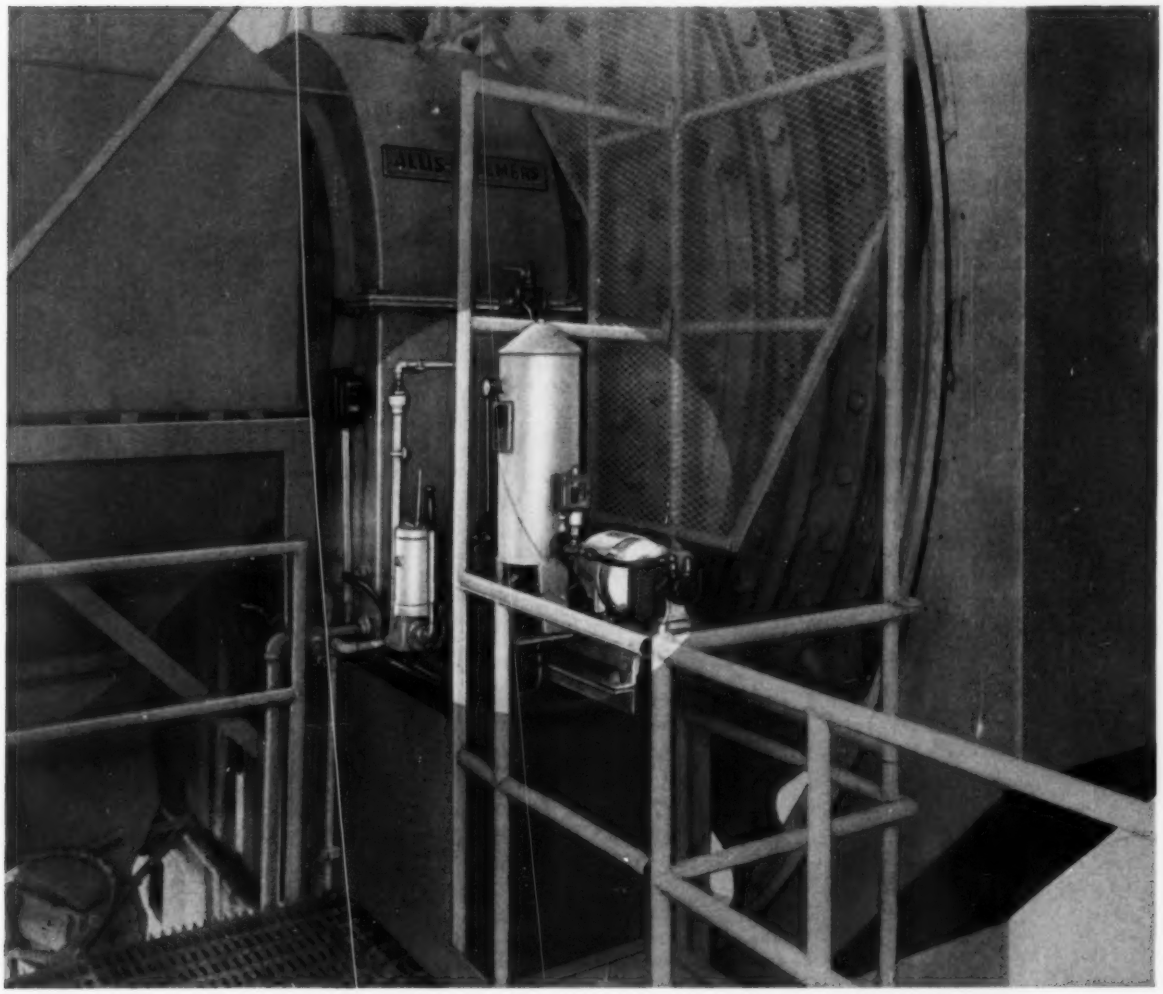
A-1269



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The new, bigger A-C grinding mills actually *float on oil.* Process industries are grinding out bigger profits because of *Lubritrol* constant lubrication system. No bearing-wearing starts. No dry sliding after shutdown. Less wasted horsepower. All functions of the *Lubritrol* system are automatic...controlled by foolproof pressure gauges and switches. The system is filtered to remove contaminants.

When you modernize your operation, check the benefits of an Allis-Chalmers grinding mill — the only mill that gives you the positive protection, the operating and maintenance economy of *Lubritrol* constant lubrication. *See your A-C representative, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.*

Lubritrol is an Allis-Chalmers trademark.

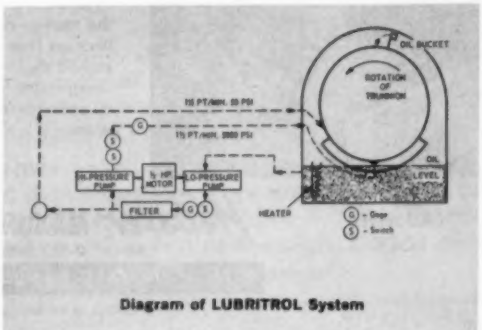


Diagram of LUBRITROL System

Missouri Limestone Group Elects Adrian President—McDonald Named Manager

Adolph Adrian, Adrian Materials Company, Jefferson City, Mo., was elected president of the Missouri Limestone Producers Association at that group's 15th annual convention recently. Registration for the session reached 214, a new record.

Other officers elected were E. L. Aussieker (Auxvasse Stone & Gravel Company, Mexico, Mo.) vice-president, and W. E. Thomson Jr. (Dietz Hill Development Company, Kansas City), secretary-treasurer.

N. A. McDonald was named manager of the association. He succeeds Ralph J. Kalberloh, who resigned to become managing director of the Missouri Safety Council.

In a program moderated by Dwight Wheelan (McLain Lime Quarry, Wellsville), Hank Ludwig (Link-Belt Speeder Company) gave the producers some money-saving ideas on quarry shovel maintenance.

At this meeting the membership adopted a safety program for 1960 and authorized the directors to work for legislation to have the state income tax allow percentage of depletion on rock. Several other programs were assigned to committees for study.

The board of directors was increased from nine to eleven members. New directors named include the following: W. R. Cullor (Cullor Limestone Company, Ft. Scott, Kans.), N. J. Cooksey (N.J. Cooksey Company, Moberly), John Griesemer (Griesemer Stone Company, Springfield), I. L. Williams Jr. (Williams Rock Mining Company, Clinton), and Charles Hayes (L. W. Hayes, Inc., Bethany).

Retiring directors were E. K. Hall, A. R. Alvis, and B. V. Everett.

CORNELIUS T. W. HOLLISTER, 90, organizer and former president of the Northwestern Portland Cement Company, Grotto, Wash. (now a division of Ideal Cement Company), died recently in Seattle, Wash.

FOR LIMESTONE

FOR CRUSHED ROCK

Webster BUCKET ELEVATORS

WEBSTER Bucket Elevators can handle practically any capacity requirement. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel.

The rough, tough service encountered in rock products plants poses many problems for plenty of producers—until they place those problems in the hands of WEBSTER Engineers.

WEBSTER Bulk Materials Handling Systems will keep your production on the move—efficiently and economically—because they are based upon "know how" gained through 84 years' experience. All components of WEBSTER equipment are manufactured and assembled in our own plant.

Write for Catalog BE-55

Webster MANUFACTURING, INC.
DEPT. Q-30, TIFFIN, OHIO
BULK MATERIALS HANDLING EQUIPMENT
Offices in all Principal Cities
SINCE 1876

Enter 44 on card, page 173

S.W. Metals-Minerals Meet Of A.I.M.E. Set for Apr. 21

The Southwest Metals and Minerals Conference of the American Institute of Mining, Metallurgical and Petroleum Engineers will be held April 21 and 22, 1960, in the Ambassador Hotel, Los Angeles. Program features will include the following: papers on energy sources for space age fuel materials; special minerals for ground installations; symposiums on boron and rock products; a mining session; and a discussion of industrial minerals and related subjects. The meeting will be sponsored by A.I.M.E. sections of Southern California, Reno, and San Francisco, in conjunction with the Rock Products Association of Southern California.

1959 Output and Value of Mica Up From 1958 Levels

The 1959 output of sheet and scrap mica, as estimated by the U.S. Bureau of Mines, reached about 99,000 short tons, valued at about $5,113,000. This represented an increase of 6 percent in quantity and 4 percent in value.

North Carolina continued to be the principal producing state. New Hampshire, South Dakota, Maine, and Georgia were other leading producers of sheet mica; Georgia, Alabama, and South Carolina were other major producers of scrap mica.

Total imports, estimated at about 11,000 tons in 1959, represented an increase of about 10 percent over the previous year's total. Exports estimated at 5,000 tons were essentially the same as in 1958.

Common stock of the Flintkote Company was recently admitted to fully listed trading on the Pacific Coast Stock Exchange. A total of 5,856,089 shares of the company's $5-par common stock started trading on a fully listed basis.

THOMAS R. ANDERSON has been appointed area marketing manager of asbestos products for United States Gypsum Company.

ALLIS-CHALMERS

A-1235

ACID AREA APPLICATION. Safety equipment and clothing are a "must" for personnel in the acid atmosphere of Dow's chlorine plant at Freeport, Texas. This **Super-Seal** motor came prepared, too — with **Poxeal** insulation guarding the stator.

Nothing...but nothing...stops Super-Seal motors

In a tough acid pump installation, Dow Chemical's Texas Division experienced no end of motor troubles. It seemed nothing could stand up in that humid, corrosive atmosphere. Reports Dow: "Even with totally enclosed motors, winding failures were frequent." And, they might have added, expensive.

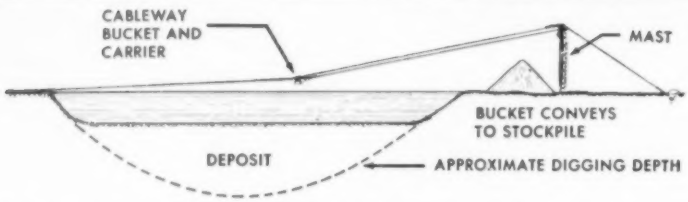
Then came *Super-Seal* motors— with amazing *Poxeal* insulation. A durable case of epoxy-resin encloses the winding end turns and slot portions of the stator . . . the most complete protection ever developed. Result? The *Super-Seal* motor, *after two years* of continuous operation in the acid area, is as good as ever. So good, in fact, that Dow has ordered 150 *Super-Seal* motors for a new chemical plant at Freeport, Texas.

Isn't it time to revaluate *your* motor standards? There's a good chance that *Super-Seal* motors can solve your motor problems, too. Contact your A-C representative or distributor, or write **Allis-Chalmers,** General Products Division, Milwaukee 1, Wisconsin.

Super-Seal and Poxeal are Allis-Chalmers trademarks.

The Best Method for Digging Under Water is a Sauerman Slackline Cableway

. . . R. W. Bisett, Pres., Olean Gravel, Inc.



A Sauerman Slackline Cableway has been excavating material for Olean Gravel, Inc. since 1930. The 1½-yd. bucket has an operating span of 1200 ft., with an average haul of 900 ft. Depth of the pit is approximately 85 ft.

Due to the long haul and digging depth, Olean uses shovels at the shore line to supplement the Slackline and maintain the 200-tph. capacity of their new plant. Mr. R. W. Bisett, President, states:

"No one has yet come up with a better way of getting material from below the water line than Sauerman."

During freezing winter months when the plant is not operating, the Slackline Cableway is kept running to build a stockpile of material. A 110-ft. mast permits building the pile to a height of about 75 ft. All digging, elevating, conveying and dumping operations are handled by the hoist operator. Gravity return of the bucket to the excavation completes the fast operating cycle.

Where long range excavation or deep digging is required, it pays to use a Slackline Cableway. Contact Sauerman for specific recommendations on your job. Catalog C, *Slackline Cableways*, gives more information on this materials handling method.

SAUERMAN BROS., INC. 634 SO. 28th AVE. BELLWOOD, ILL.
Linden 4-4892 • Cable CABEX–Bellwood, Illinois

Crescent Scrapers • Slackline and Toutline Cableways • Durolite Blocks

Enter 46 on card, page 173

World-wide Cement News

Cement Plant in Okinawa Subsidized by Govt. Loan

A 100,000-ton capacity cement plant will be built in the Yabu district of Okinawa by Nihon Cement Company, Tokyo, in co-operation with Okinawan interests. The facility is scheduled to be in operation late in 1961, according to the New York *Journal of Commerce*.

The Ryukyu Cement Company, a $600,000 firm established last September, and Nihon will be granted a $4,100,000 loan from the Economic Development Corporation of the Ryukyus in order to finance the projected plant. The Ryukyu Islands are between Formosa and Southern Japan.

Indian Cement Industry Grows By Expansions, New Plants

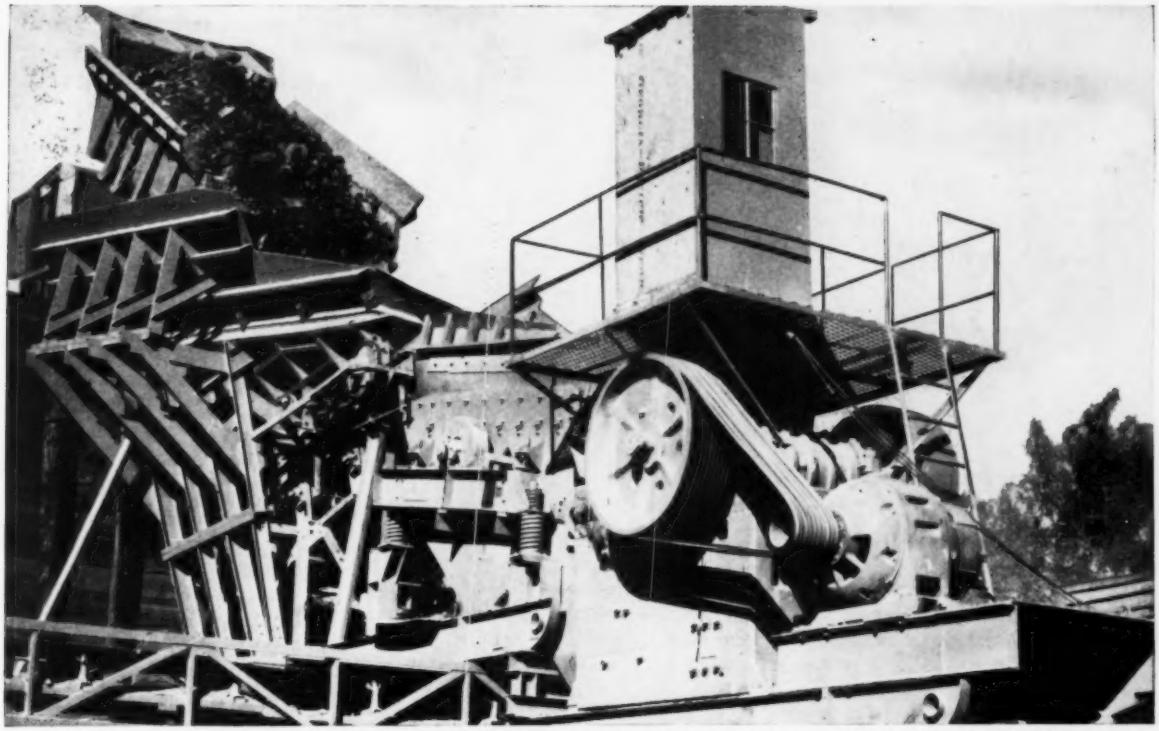
Panyam Cements & Minerals Industries Ltd., a cement manufacturer in Cement Nagar, India, plans to expand production from 200 to 600 t.p.d.

A co-operative cement plant, to be known as Tandur Co-operative Cement Factory, is scheduled for Hyderabad, India; capitalization is reported at 2.5 million rupees ($535,000).

Second Extension Planned By Jordan Cement Concern

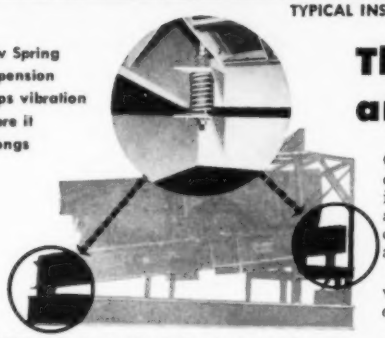
Management spokesmen for the Jordan Cement Factories Company, Jordan, have announced that a second extension, costing about $1 million, is contemplated near Amman. At this site the first extension to the original plant is now being equipped with facilities which will increase output by 300 t.p.d. Production at this part of the plant is expected to begin within a few months.

It was indicated that the second addition will increase daily output by another 300 tons. Jordan Cement has a fully subscribed capital of $4.2 million, with 50 percent of the shares owned by the government. It is expected that authorized capital will be increased to $5.6 million.



TYPICAL INSTALLATION of Pioneer Primary Plant with scalping screen between 14′ feeder and 3042 jaw crusher

New Spring Suspension keeps vibration where it belongs



(ABOVE) Dual sets of coiled springs at each corner of screen frame actually float the screen to prevent transfer of vibration to the supporting structure. This is *an exclusive feature* of PIONEER Vibrating Screens that increases screening efficiency while protecting the frame and structure.

There's only one "best" way to design an efficient stationary quarry plant

Overall design of an efficient stationary quarry plant calls for thoughtful probing in at least four important design areas: 1) installation cost, 2) plant components, 3) performance records, and 4) maintenance expense.

And when you get right up to the wire, you'll generally find there's really *only one best way* to design it.

Let's consider, for a moment, how PIONEER checks out in these areas:

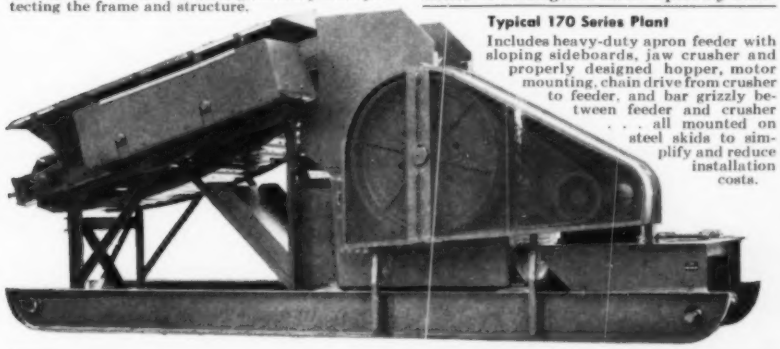
Installation cost. All major components are designed as completely integrated units to facilitate field erection. (See, for example, skid-mounted feeder and crusher shown at bottom left.)

Plant components. Construction of PIONEER Feeders, Crushers, Screens and Conveyors is based on improved design features that make them brutes for sustained strength and smooth operation. (Secondary spring suspension of vibrating screens is a typical example.)

Performance record. PIONEER heavy-duty feeders and overhead eccentric jaw crushers are more often specified for the really tough jobs than are other feeders or crushers.

Maintenance expense. PIONEER Plants are built to give long and satisfactory service under the most strenuous operating conditions and with an absolute minimum of maintenance.

For all the facts, see your nearby PIONEER Distributor or write PIONEER ENGINEERING, Minneapolis 14, Minn.



Typical 170 Series Plant

Includes heavy-duty apron feeder with sloping sideboards, jaw crusher and properly designed hopper, motor mounting, chain drive from crusher to feeder, and bar grizzly between feeder and crusher . . . all mounted on steel skids to simplify and reduce installation costs.

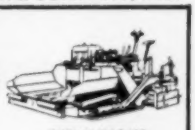
Pioneer®
ENGINEERING
DIVISION OF POOR & COMPANY, INC.

PORTABLE CRUSHING PLANTS

WASHING PLANTS

STATIONARY QUARRY PLANTS

BITUMINOUS MIXING PLANTS



BITUMINOUS PAVERS

Interested visitors viewing a Jaeger air compressor.

Jaeger, Thor Equipment Stars at Columbus Meeting

A group of distributors and salesmen attended a joint demonstration and sales meeting held recently at Columbus, Ohio, by the Jaeger Machine Company of that city and the Thor Power Tool Company, of Aurora, Ill. Attending salesmen were from Ohio, Michigan, Indiana, Kentucky, and Missouri.

At the first day's session, held at Marble Cliff Quarries, west of the city, the new Jaeger 900-ft. rotary air compressor was demonstrated, operating two Thor TR-5 air-and-hydraulic rock drill crawlers, each equipped with a 4½-in. drifter. Every man present was given the opportunity to operate the controls of these units.

Holes were drilled to a depth of 25 ft. in limestone so exceptionally hard that the insert carbide bits on the drills required regrinding after every 48 to 50 ft. of drilling. The compressor maintained constant full pressure behind the tools without operating faster than 1,400 r.p.m.

Sales meetings on Jaeger air compressors were conducted by Dale Murray, sales manager, Jaeger's Air Compressor Division. B. H. Johns, vice-president in charge of sales, and Robert Shulters, chief engineer, Thor Power Tool Company, directed this firm's meetings.

Guests attending the showing of Jaeger Machine Company and Thor Power Tool Company equipment move in to inspect a new model Thor drill at Marble Cliff Quarries, near Columbus, Ohio.

7th Annual Industry Study On Sand, Gravel Output Launched by N.S.G.A.

The seventh annual study of the economic contribution made by the commercial sand and gravel industry to the total production of the United States is now being conducted by the National Sand and Gravel Assn.

According to data received from the U.S. Bureau of Mines, total sand and gravel production in 1958 amounted to more than 680 million tons, valued at approximately $650 million.

Questionnaires for the compiling of this confidential report have been sent to hundreds of producers. No distinction is made between members and non-members; and it is hoped that all will co-operate fully.

In case your name has been inadvertently overlooked, you may obtain blanks by writing to the National Sand and Gravel Association, Suite 1000, 1411 K Street, N.W., Washington 5, D.C.

Tractor Welding Procedure Covered in New Data Sheet

One of the most rewarding applications for hard-facing around the pit, quarry, or plant is in the rebuilding of worn crawler-tractor rails. As normal wear occurs, the rails should be watched closely When ⅛ to $\frac{3}{16}$ in. has been worn away, the rails should be hard-surfaced immediately. A minimum of welding labor is involved at this stage, and a single pass usually will provide a wearing surface to retard future wear.

A new 4-page data sheet giving step-by-step procedures, with diagrams, of the proper methods to be used to gain best results has just been made available by the Rankin Mfg. Co. The folder answers such questions as: When should rails be hard-faced? What is the correct welding procedure? What rod sizes should be used? What welding heats are recommended? What are the effects of weather conditions on the job? What can be done with hard rails—with soft rails?

A Copy of Data Sheet No. 102, *How to Ranite Tractor Rails,* may be obtained without cost from local Ranite distributors, or directly from the Rankin Mfg. Co., P. O. Box 631, Alhambra, Calif.

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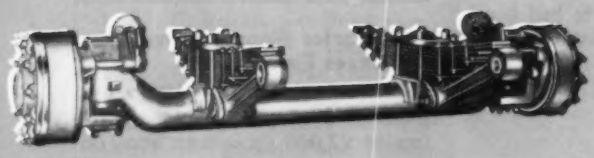
KW-DART 30-S

SPACE Problem?



Rugged Wide Track Front Axle.
The ruggedness and high capacity of this front axle assure long life and dependability. Wide track (113″) permits oversize tires—no loss in turning angle and a high degree of stability.

30-Ton Payload –this is real capacity in a two-axle truck. Tires are same size front and rear, deliver maximum flotation and can be interchanged.

Space for load capacity and space to maneuver are problems. KW-DART has the answer to both in their Model 30-S.

Short Wheelbase —compact, close coupled design with greater turning angle of the front wheels makes the KW-DART 30-S highly maneuverable in limited space at the shovel or hopper . . . and in tight turns on the road. The unusually short turning radius is only 28 feet.

KW-DART TRUCK CO.

1301 North Manchester Trafficway
Kansas City 41, Missouri, U.S.A.
Cable Address: DARTRUCO

P.O. Box 157

158

Aspirant to U. S. Citizenship

Aided by Employers and TV Show

Bill Pozenel, standing beside the truck he drives for the Albuquerque Gravel Products Company.

IN November, 1958, the management of the Albuquerque (N.M.) Gravel Products Company became interested in the plight of Julian Pozenel. Several years previously the 32-year-old Albuquerque "man without a country," after surviving the rigors of a Nazi slave labor camp, managed to reach Canada. His great desire was to become an American citizen. However, because he lacked a quota number under the immigration laws which would permit legal entry into the United States, he took the risk of entering illegally.

Mr. Pozenel (by this time called "Bill") had been arrested a number of times in various cities for immigration violations and then released. Each time he was told that he was being held for deportation; but through a series of legal maneuvers this action was stopped. Senators and representatives from New Mexico attempted to put through legislation which would provide the prisoner with the assistance he required to remain in this country, but they were of no avail.

It was then brought to the attention of the gravel company's personnel director, J. R. Alexander, that Bill needed a job. After Mr. Alexander had interviewed him with his attorney, Arthur Brown, and Dr. Glenn Darrow, who had been assisting with the case, Bill became a truck driver for this firm.

His case was assigned to an Albuquerque attorney, R. D. Moyer, by Judge Carl Hatch of the United States District Court. He had been charged again with violation of the immigration laws.

The matter came to a head during the July 4, 1959, holiday, when Judge Hatch took an unusual action and opened his court on a holiday. A writ of Habeas Corpus was issued, which held up for an indefinite time all attempts to deport Mr. Pozenel. A short time later the State Department granted the quota number, the goal he had been seeking. Bill had become acquainted with a very charming young lady, whom he married after he had obtained his number.

Late in 1959 the story of this courageous future American was featured on the popular TV show, "This Is Your Life." The management of the Albuquerque Gravel Products Company was represented by Jack Alexander; present also were Mr. Brown, Dr. Darrow, and Mr. Moyer.

The following story, considerably briefed, was unfolded to TV viewers:

As a former displaced person having no living relatives, he had set his heart on going to the United States in 1944, when he was liberated from a Nazi camp in Italy. He tried to join the Foreign Legion, but bowed out when he found that it was full of former SS troops. He was shipped to France, and from there he roamed over Europe and England. At last he was able to reach Canada (1951), and from that country he began making attempts to enter the United States. Finally being given his coveted number was the climax of the story.

Bill Pozenel and Mrs. Pozenel at the recent "This Is Your Life" show in which he was featured. At the far left is Ralph Edwards, and beside him is Jack Alexander, the company's personnel director; others who aided Mr. Pozenel are R. D. Moyer, immediately behind Bill; Dr. Glenn Darrow, behind Mrs. Pozenel; and Arthur Brown, attorney, far right.

3rd Quarter Fluorspar Imports Continues Rising Trend

In the third quarter of 1959, mine production of crude fluorspar ore totaled 92,000 short tons from domestic sources. Fluorspar mills processed 103,500 tons, from which were recovered 38,300 tons of finished fluorspar. The total production of finished fluorspar (39,900 tons) included 1,600 tons of material marketable as mined.

According to reports of producers to the U. S. Bureau of Mines, shipments of finished fluorspar, including material marketable as mined, totaled 38,700 tons, valued at $1,967,000. During the third quarter of 1959, imports for consumption increased considerably over those in the third quarter of 1958.

Industry Personalities

E. G. Swenson

E. G. SWENSON, analytical chemist in the field of cement and concrete research, has been appointed director of research for Miron Cement Inc., Miron & Freres Ltd., and their associated companies.

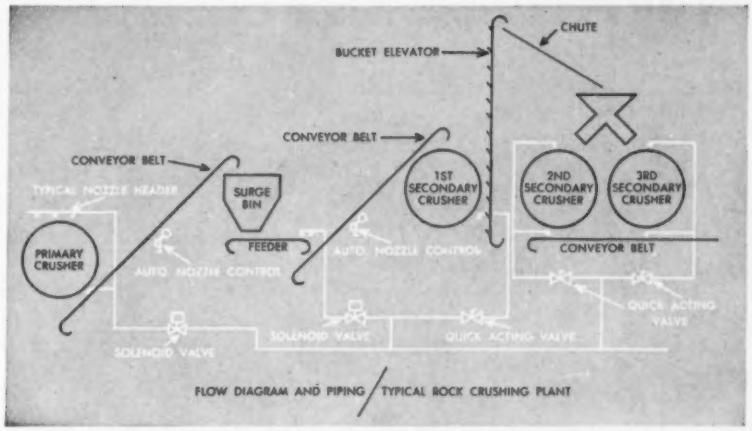
Mr. Swenson is presently chairman of the committee on hydraulic cement of the Canadian Standards Association and a member of A.S.T.M. committees for cement and concrete in Canada.

CLARENCE A. GUSTAFSON has been appointed general manager of County Line Stone Company, Inc., Akron, N.Y. He will have complete charge of production, sales, and a future expansion program. Mr. Gustafson recently resigned as production manager of the Buffalo Crushed Stone Corporation, a unit of Houdaille Industries.

R. H. B. SMITH, executive vice-president of Dragon Cement Company, recently served as chairman of the General Contractors Division of Travelers Aid Society of New York's 54th Annual Fund Drive. More than 300 key civic and business leaders in the New York area participated in the drive for funds.

DOUGLAS C. GARDNER is the new assistant general sales manager and JAMES R. STRONG is the new sales manager of the Toledo sales division of Medusa Portland Cement Company. Mr. Gardner has been with Medusa's Toledo division for 10 years; Mr. Strong has been a special representative in the Cleveland metropolitan area.

JOHNSON MARCH ► chem-jet DUST CONTROL SYSTEM



DUST PROBLEM SOLVED economically at typical rock crushing plant. Drawing shows location of Chem-jet applications after system was engineered by Johnson-March.

NOW YOU CAN AFFORD DUST CONTROL

At a fraction of the cost of other methods, Chem-jet brings you efficient, practical dust protection. Chem-jet solves your dust problem by attacking dust at its source. It is the only system of its kind that effectively *prevents* dust from becoming airborne.

- **Low-Cost Dust Control—**

  No other system compares to Chem-jet for low first cost, low operation and maintenance.

- **Each Installation Engineered—**

  To solve each specific dust problem, Chem-jet systems are specially engineered to meet all requirements.

- **Effective Dust Control—**

  Carries through from crushers to stock pile without affecting screens.

Engineering analysis of your dust problem will be made at no obligation. Johnson-March Corporation, 3018 Market Street, Philadelphia 4, Pa.

JOHNSON MARCH DUST CONTROL ENGINEERS

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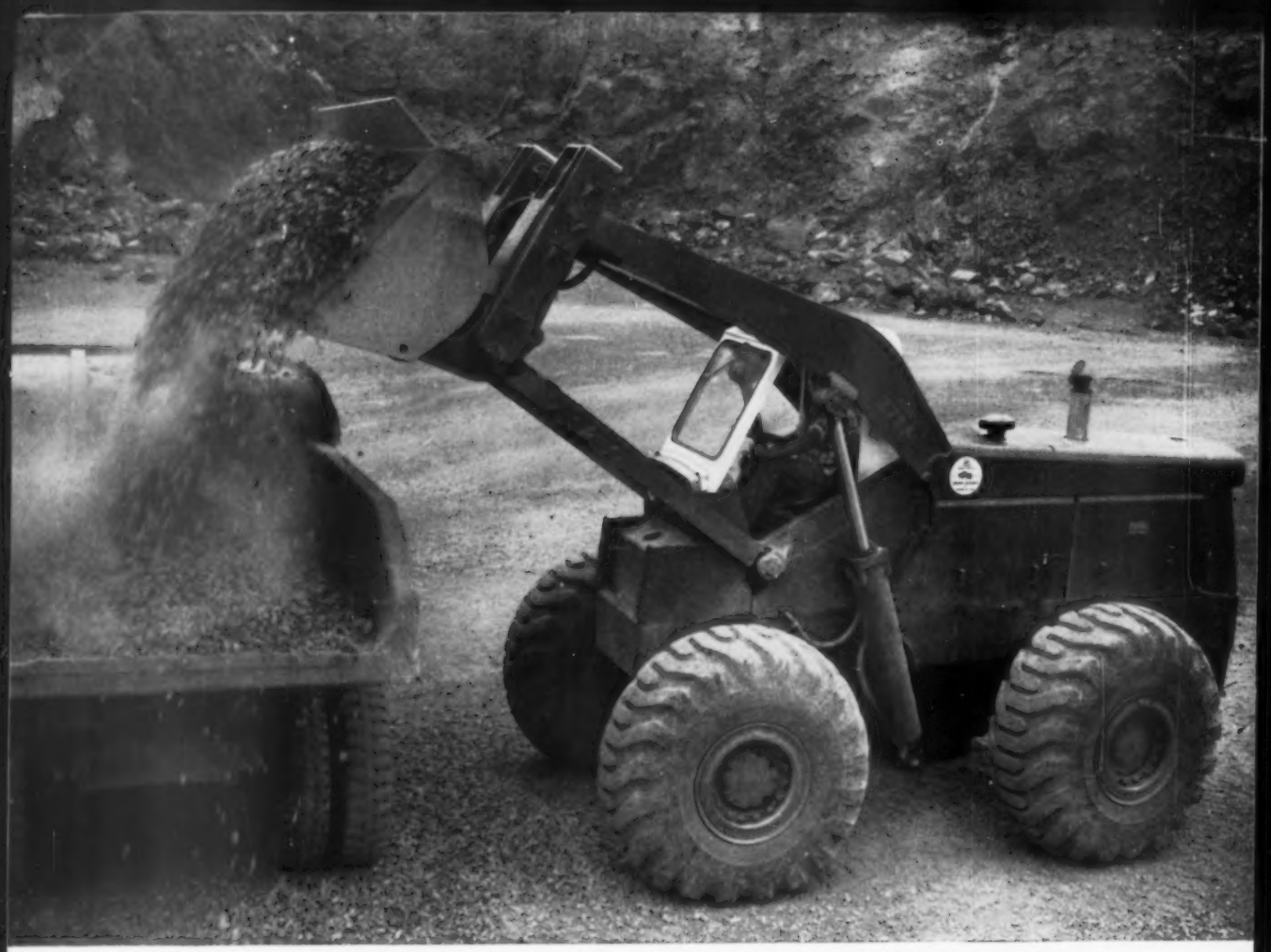

Their aim: *to double production without increasing overall loading costs.*
Solution: *this 4½ yd Michigan Tractor Shovel. Its regular time-record:*

60 SECONDS TO LOAD

At the Oneglia & Gervasini pit near Woodbury, Connecticut, they are loading trucks in *half the time* it ever took before!

Overall loading *costs*, nevertheless, have stayed practically the same!

Reason for this production-doubling, cost-cutting record is the 4½ yard Model 275A Michigan Tractor Shovel shown on these pages. This unit has *1½ times the bucket capacity* of the most commonly-used size of mobile Tractor Shovel. Its speed of loading has been remarkable . . .

Heaps small trucks in 20 seconds, 20 yard semi-trailers in 2 minutes

Working mostly with 10 yard, 10 wheel trucks in this 1,000-ton-per-day traprock quarry, the Model 275A has established an average load cycle of only 60 to 70 seconds —*from first pass into a stockpile 'til loaded truck pulls away.* "On our busy days," reports Supt Theodore Tietz, "we move 10-yard trucks out of our pit at the rate of one per minute." Smaller trucks generally require only 20 to 30 seconds (one pass) to load. Twenty to 24 yard semi-trailers usually take 2 to 2½ minutes (four or five passes). These records cover two years of operation and all grades of crushed stone, all kinds of weather. In one typical time-and-motion study, for example, the Model 275A regularly dug into a half-frozen stockpile of 1½ inch stone and backed off with a heaping 4½ yard payload *in only 7 seconds!*

Carries 5 ton load up 35° slope

High-speed loading like this has been *only one* of Michigan's important achievements. The 262 hp rig has taken over some tough stockpiling chores too. Like moving two-inch stone to the top of a 100 ft high stockpile. The last 60 feet of ramp to piletop here is pitched *at a 35-degree angle*—yet the Michigan regularly carries a heaping *5 ton load* up it. Back-dragging on the return trip accurately spreads and compacts a 4 to 5 inch layer of gravel to keep the ramp graded for continuous dumping.

"I particularly like Michigan's bucket action. Even in frozen stone, you can push in and get a full load without straining"—Operator Bob Faccin.

SPECIFICATIONS		
	Model 275A	Model 375A
Bucket capacity (standard SAE ratings)	4½ yards	6 yards
Lifting capacity	22,000 lbs	30,000 lbs
Weight	46,000 lbs	61,000 lbs
Speeds (forward and reverse)	0-28 mph	0-25 mph

Seven other standard Michigan Tractor Shovel models, 16 cubic feet to 2¼ cubic yards (SAE bucket ratings), are available.

"This big Michigan effectively dresses stone stockpiles. Its 10'8" wide bucket makes it an excellent snow plow. It even does well on such tough dozer jobs as shovel cleanup and stripping quarry top prior to drilling"—Supt Theodore Tietz.

EACH 10 YARD TRUCK

Moves 11 ton boulders

Michigan handles "super-lifting" assignments too that smaller Tractor Shovels couldn't touch. Rip-rap, for example. Some of the traprock boulders uncovered in the Onegla-Gervasini pit weigh 10 or 11 tons! The Michigan makes short work of stockpiling or loading them into trucks. "In fact," says Supt Tietz, "the Michigan frequently in the past 2 years has moved rocks our quarry shovel couldn't handle!"

Model 275A easy to maintain

One reason O & G's Michigan performs so well on all these tough jobs is its all-Clark power train . . . Clark torque converter, power-shift transmission and planetary wheel drive axles . . . all matched to each other . . . all designed to the same general specifications as the Clark components which have proved so efficient in the 15,000 smaller Michigan Tractor Shovels sold since their introduction in 1954. Also, some credit for Michigan's good performance here should be given the simple, systematic maintenance procedure followed. About half an hour a day takes care of lubrication as well as oil, water and torque converter oil check. Once a week engine oil and air filters are changed. "It's an easy machine to service," says Operator Bob Faccin, "and we feel the time is well spent."

If you load trucks, we honestly believe *your* time will be well spent on a study of the big Michigans. Both the 4½ yard Model 275A, described here, and the bigger 6 yard Model 375A are now proved by over two years in the field. Both are in regular production and readily available. See your local Michigan Distributor for details on performance . . . price . . . and delivery!

CLARK EQUIPMENT

Michigan is a registered trade-mark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division
2479 Pipestone Road
Benton Harbor 27, Michigan
In Canada: Canadian Clark, Ltd.
St. Thomas, Ontario

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At pug mill, Michigan Dozer moves 550 tons hourly up to 150 feet.

Major Southern quarry chooses Michigan Tractor Dozer for top-production job

375 hp model feeds 550 tons hourly to pug mill

Same unit also handles shovel and blast cleanup in pit ½ mile from mill.

At its top rate, this Michigan Tractor Dozer moves 550 tons of crushed stone an hour!

Pushes, one-way, range up to 150 feet.

Same unit also cleans spillage around two rock shovels located ½ mile away.

It alone does the work of two 50,000 lb class crawler dozers.

Owner: Lambert Brothers Division of Vulcan Materials

The Dozer is a 375 hp, 74,000 lb Model 380 Michigan. It is owned by Lambert Brothers Division of Vulcan Materials Inc, Birmingham, Alabama, one of the nation's largest stone pro-

New Michigan Tractor Shovel, latest of 15 owned by Lambert, truck-loads 3,500 tons daily

One of Lambert Bros 15 Michigan Tractor Shovels. This unit, a new Model 175A with 3¼ yd bucket, handles all truck-loading, also dresses stockpiles in Lambert's Nashville quarry. It loads 200 to 250 trucks, 3,000 to 3,500 tons per 8-hour day. Each pass—2700 lb/yd 3″ stone down to −100 filler dust—averages 4 tons, each load cycle takes 20 to 30 seconds. Unit works out of 25 stockpiles, scattered over 100 acres. Furthest run is ¾ mile—easy for the Model 175A's fast rubber-tired speed of 27 mph.

ducers. The Lambert Division alone operates 25 quarries in Tennessee, North Carolina, Kentucky, and Virginia; they are using this Dozer in their 80 acre pit near Nashville.

The story starts last summer. Harold and Glen Lambert had just installed the pug mill and needed something to feed it. Their existing crawler dozer wouldn't do; it obviously didn't have the mobility to do both pit cleanup and mill feeding. Another big *crawler* would be needed, it seemed. Then Nashville distributor McCarthy, Jones & Woodard suggested a rubber-tired Michigan Tractor Dozer. One was tried. The problem was solved. From four available sizes, a 375 hp model was chosen as best suited to the need (the other size Michigan Dozers: 162, 262, and 600 hp).

Main jobs: feed mill, clean around shovels

The 375 hp machine has been busy ever since.

Most of the time it works at the pug mill—dozing out into a stockpile from the feeder belt when the mill isn't running—feeding when the mill is running at a higher rate than available plant production (half or more of the crushed rock is fed into trucks and hauled to regular stockpiles).

Four to eight times a day, the 25 mph Michigan leaves the mill and drives down blacktopped roads to the quarry for shovel cleanup. Unit makes the ½ mile trip, which took crawlers 20 minutes or so one-way, in 2 to 3 minutes.

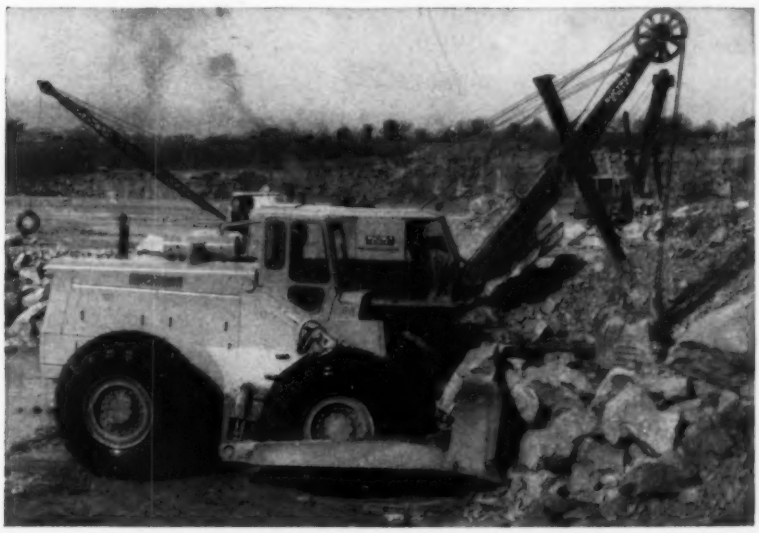
50% cut in shovel cleanup time

In the pit, the Michigan saves more time (and money). Back in Lambert Brothers crawler days, a good operator could clean the spillage around one shovel in 5 or 6 minutes. Today, their high-speed Michigan does each cleanup in 2 to 3 minutes.

50% cut in blast cleanup time

Another example of time saved is in blast cleanup. Once or twice a week, Lambert's crew shoots the 90 ft high quarry face. Each blast breaks about 22,000 tons of limestone, throws some rock as far as 600 ft. Used to take a crawler 45 minutes to an hour of full-time work to police the area. Now, the Michigan Tractor Dozer cleans up in 20 to 30 minutes.

Sound worthwhile for *your* job? Why not check first-hand? Drop us a line—or call—we'll show you a Michigan Tractor Dozer in action so you can judge for yourself.



Travel speed, job to job over pavement, reaches speeds of 25 mph.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2479 Pipestone Road
Benton Harbor 18, Michigan
In Canada:
Canadian Clark Ltd.
St. Thomas, Ontario

Enter 54 on card, page 173

FOR REALLY EFFECTIVE RESULTS ON YOUR NEXT SHOT...

WHICH EXPLOSIVE?

This is a photographic enlargement of Atlas Pellets.

New explosives, blasting agents, and techniques are being developed at an ever increasing rate. Operators are using these developments to find new answers to the old problems of getting more payload work from shovels, trucks, crushers, conveyors . . . all their equipment all along the line. And they are finding that the lowest true blasting costs depend upon determining *which explosive* and which blasting methods combine to give the best breakage, displacement, and control at the lowest overall cost.

For example, are you familiar with one of the newest developments . . . ATLAS PELLETS? They are a new form of ammonium nitrate designed especially for blasting. They are porous, compact particles which have oil absorption characteristics equal to that of prills. Yet they have higher density for more efficient blasting. And they are exclusive with Atlas. But just because they are new, they are not necessarily the best explosive for your operation. Ask your Atlas representative about Pellets, and about the complete Atlas Line. It's his job to help you decide which explosives make the right combination to give you really effective results on your next shot.

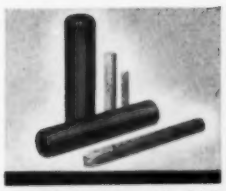
There is only one way to look at explosives costs, and that is: which explosive will give you the most payload service from all your equipment? Our blasting cost chart, slide rules and technical literature are designed to help you do exactly that. Ask your Atlas Representative about them . . . or, write directly to:

ATLAS POWDER COMPANY
Explosives Division, Wilmington 99, Del.

ATLAS EXPLOSIVES

When you use the right combination, all your equipment moves in sooner... works faster... produces more.

ATLAS PELLETS, a new form of ammonium nitrate, have both the density and sensitivity required for efficient ammonium nitrate blasting.



GIANT GELATINS are for high velocity shattering action. They are advantageous for extremes of wet work and for hard, tight shooting.

GIANT "75" PRIMERS have the wallop required for complete, efficient detonation of both field mixed and plant mixed blasting agents.

ROCKMASTER® electric blasting caps achieve the staggered action which has been so important in producing better breakage and control.

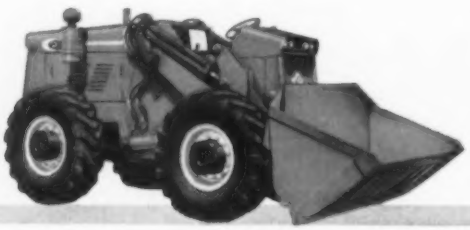
LIKE A LOADER WITH EXTRA REACH?

The TL-20 has it! Means fast, even dumping into high-sided trucks—no wasting time leveling material to distribute it evenly.

That extra foot or two of reach that you get with a TL-20 tractor loader makes a big difference in your output. You clip valuable seconds from work cycles by dumping loads right into the center of high-body trucks. No time-consuming loading from both sides . . . no pitching . . . no wasting time dozing to distribute material evenly—and no banging up truck and loader.

Other exclusive advantages include: *Faster Shifting*—one lever controls both forward-reverse and all speeds. *Greater Stability*—easier loading, less spillage, more operator comfort. *Strong, Pin-Connected Axles* prevent rolling and shifting of axles under load. Your Allis-Chalmers dealer can show you other tractor loader advantages that bring extra production on excavating and loading work. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

TL-20—6 buckets, from 2¼ to 5 cu yd • 130-hp diesel • 23,250 lb • 9,000-lb. carry capacity



move ahead with

ALLIS-CHALMERS

power for a growing world

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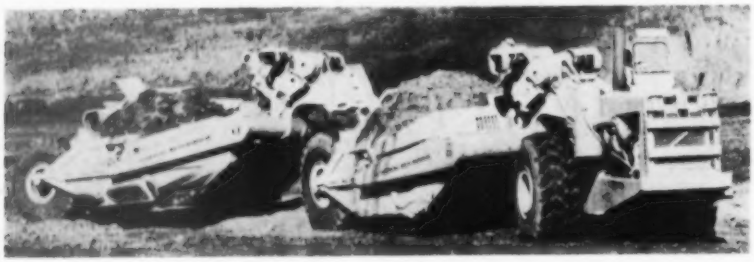
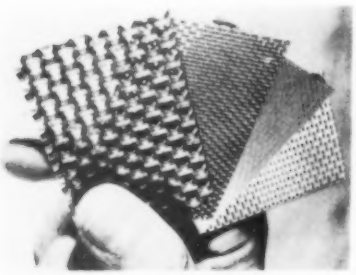
ALLIS-CHALMERS
TL 20

new machinery



● LeTourneau-Westinghouse announces the availability of a line of tandem earthmoving scrapers ranging in capacity from 18 to 56 cu. yd. The second scraper can be quickly removed to convert to conventional single-unit operation. In the picture above is the Model C version. Its capacity is 36 cu. yd. Tandems are available behind all three sizes of 2-wheel Tournapull prime movers, as well as 4-wheel Speedpull. (351)



● Varel Manufacturing Company has developed a new formation-type rock bit for blast hole drilling in mining and quarrying operations in which fast penetration rates are necessary but excessive gauge wear is a problem. The new bit formation type is the Varel VH-3T, developed to provide increased footage and lower cost operation in abrasive formations of medium hard limestone or sandstone.

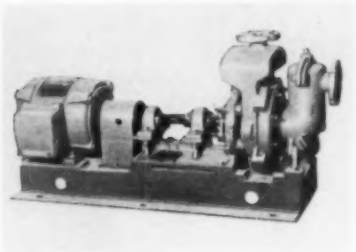
The new bit features "balanced design", in which the tooth-cutter arrangment of each cone is balanced in relation to the other cones. This assures long life and even bearing wear on all three cones while providing optimum bottom hole cutting pattern for faster drilling. (352)

← A pierced Metal Sheet known as "Conidure," used for screening, recovering, or dewatering aggregate, and various solids-bearing liquids passing through gravity or centrifugal separators, has been introduced by Cross Perforated Metals, National-Standard Company.

Conidure is made by a patented process licensed to National-Standard Company. Trapezoidal holes are pierced in sheets of carbon steel, stainless steel, copper, brass, or aluminum. Sheet thickness can be up to seven times hole diameter—hole diameters ranging from 0.004 to 0.099, and sheet thicknesses ranging from 0.014 to 0.079 in. The metal, available in several degrees of smoothness, from unrolled to rolled flat with electrolytic polish, comes in sheets up to 31 in. wide; or it may be formed into sheared shapes, cones, segments, and cylinders, according to the requirements of the application.

The working side, which has the smaller end of the tapered holes, has humps that act in shovel-like fashion to guide material to the openings. Conidure's long life and freedom from clogging, according to the manufacturer, results from this shovel-like action, and from the steep breakaway of the hole sides from the working side of the sheet. (353)

● Centrifugal pumps in the new AW Series introduced by Nagle Pumps, Inc., have capacities up to 1,000 g.p.m., with heads up to 125 ft. Sizes range from 1 in. to 5 in.



The pumps are self-priming, and can be stationed above the liquid level. They feature a trap with a readily accessible and removable strainer. It is this trap that holds the prime. Suction entrance is at the top of the trap. The separator below the discharge opening is an integral part of the casing and is designed so that the over-all height of the pump is kept to an absolute minimum.

Three types of bearing stands are available. Illustrated is the type K bearing stand for medium service or average conditions. The complete unit—stand and water-end—is designated a KAW pump. A heavier duty unit, in which much of the shaft is enclosed within the bearing stand, is available, as well as a third type, with a light bearing stand. (354)

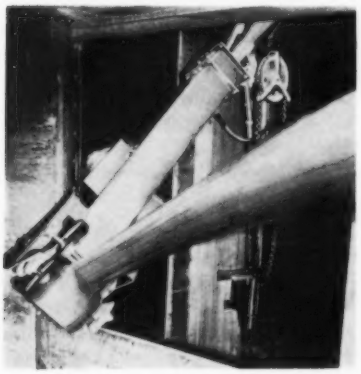
● A new "Standard Duty" and a "Hi-Type" Swiveloader have been developed by Stephens-Adamson engineers to fill and trim large boxcars quickly, while eliminating dust exposure for the operator.

The Standard Duty unit mounts to wall or structural supports. Operator, swinging Swiveloader inside boxcar door, can, without entering car, swivel thrower and direct stream of material toward one end of car. When one end of car is filled, operator simply swivels unit around and

and equipment

for further information use card on page 173

directs stream to the other end, without stopping the feed of material. Material is thrown in the desired direction from the short, endless, high-speed conveyor belt of the Swiveloader thrower unit. The Standard Duty Swiveloader is available in a 10-in. belt width.



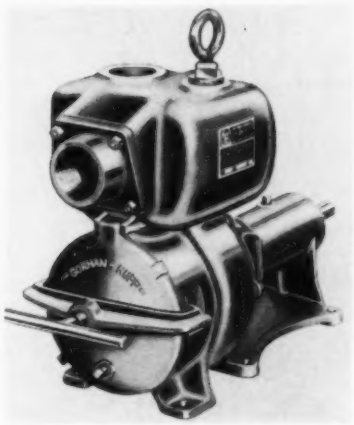
The Hi-Type Swiveloader operates in the same way as the Standard Duty model, except that while the Swiveloader is loading and trimming one end of a boxcar, the operator can spot the next car, and place the doors, thereby speeding up the entire loading operation. The Hi-Type unit is so designed that it can be swung easily over a 60-inch bulkhead. It is available with a 10- or 16-in. belt. Both Standard and Hi-Type units handle free-flowing, small-lump, granular bulk materials. (355)

● To cut down maintenance costs of hand-held rock drills, Keystone Lubricating Company has developed a specialized lubricant, "Keylubric."

The lubricant, according to the manufacturer, provides high film strength, with the stability to support severe pressures and heat. Its ability to adhere to wet surfaces assures a protective, corrosion-resistant film. Its low frictional quality reportedly reduces power losses, thus promoting smoother, faster operation. (356)

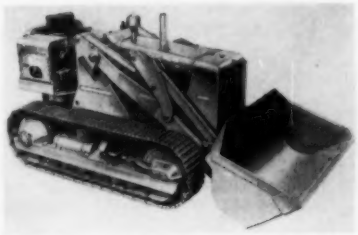
● The Gorman-Rupp Company has added the Model 12B2, 2-in. suction and discharge, to its line of self-priming centrifugal solids handling pumps. Impeller design of the Model 12B2 permits the passing of spherical solids up to 1⅛ in. in diameter. Capacities range from 20 to 220 g.p.m.

The pump mounts high and dry, with only the suction in the sump. Features include a removable end-plate for quick, easy inspection and maintenance, and a renewable wear-plate. (357)



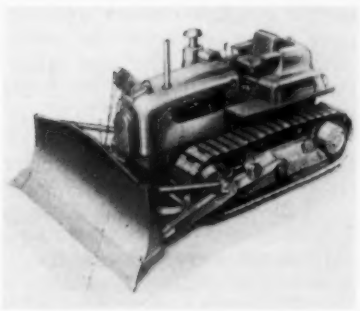
● A new 1½-cu. yd. HD-6G tractor shovel is now in production at the Allis-Chalmers Manufacturing Company. The new unit is powered by a four-cycle diesel engine rated at 72 net hp. Four forward speeds from 1.5 to 5.5 m.p.h., and two reverse speeds of 2.0 and 4.1 m.p.h. can be selected with the single lever shift.

Dumping height of the HD-6G is over 9 ft. It has ample reach to get bucket loads out to the center of high sided trucks or up and over the sides of excavations. The new curved bottom bucket tips back 40 deg. at ground level, with 21,500 lb. of pry-out force at the cutting edge.



Solid steel booms and linkage are fully in-line with the lift and dump cylinders. Wide spaced boom pivots are straddle-mounted on the double-walled shovel side frames for exceptional stability and strength. Long six-roller tracks distribute tractor and load weight to give the HD-6G the balance necessary for the safe handling of big loads at high production speeds. Extra heavy-duty truck frame guards and truck wheels are standard equipment.

Attachments include a hydraulic ripper and a backhoe for rear mounting and a rock bucket, rock fork, light material bucket, lift ton and lift forks, crane hook, and straight and angling type dozers for front mounting. (358)



● Euclid Division, General Motors Corporation, has in production a new Model C-6 tractor, with 211 net horsepower and a Torqmatic drive consisting of torque converter and semi-automatic transmission which eliminates the master clutch. Changes from one of the three for-

ward speed ranges to another, and from forward to reverse and back again, are made under full engine power. Smooth, positive track control is provided by a system of common braking and steering that requires no adjustment of steering clutches or brakes. The front equalizer bar is designed to give both vertical and lateral support without cross braces. Track roller frames are pivot mounted on the main frame. A rear-mounted cooling system and dry-type air cleaner are other features of the C-6.

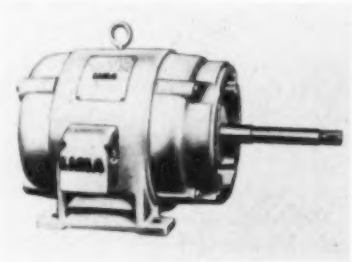
Bare operating weight of the unit is 42,000 lb. Top speed, forward and reverse is 7.9 m.p.h. (359)

● A new conveyor for handling non-abrasive materials at capacities up to 210 t.p.h. has been developed by The Fairfield Engineering Company. The conveyor is rubber mounted and has discharge heights ranging from 10 to 17 ft. Flight speed is 120 f.p.m.

Optional features include hydraulic steering, hoisting, and chute swing. A choice of electric motor, gasoline, or diesel engine is available. (360)

● The Lima Electric Motor Company, Inc., is offering a line of drip-proof, close-coupled pump motors in new N.E.M.A. rerated frame sizes, in capacities from ½ hp. at 900 r.p.m. through 75 hp. at 1800 r.p.m., and frames 182 through 405 U. Also offered are explosion-proof and totally enclosed, fan-cooled pumps from ½ hp., 900 r.p.m. through 30 hp. Frames for these are 182 through 326 U.

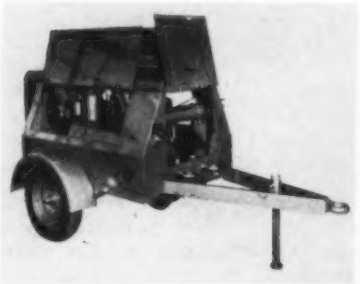
The newly designed frames are



rigid, seasoned, cast iron, with integrally cast feet. Cast-iron endbells have precision-machined registers and bearing fits. Deep-drawn baffle plates in endbells provide extra protection for winding. Connection boxes can be rotated to facilitate connecting.

Lima Electric Motor Company furnishes 2- and 3-phase pump motors in all frequencies and commercial voltages below 600 v. (361)

● A new 85-c.f.m. portable rotary compressor is available from the Gardner-Denver Company. The self-contained, two-wheel Model RP85



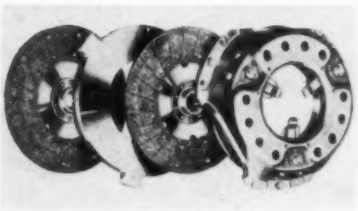
compressor is designed for jobs requiring limited air output and maximum portability. It is a single-stage unit, powered by a four-cylinder engine, and is readily adapted into a truck-mounted unit.

Features of the RP85 are: compressor vanes can be easily removed, replaced, or inspected; inspection plates provide access to vital parts for inspection and maintenance; and positive-metered oil flow assures lubrication, cooling, and sealing under all operating conditions. (362)

● Because of a highly abrasive operating atmosphere, the Quality Limestone Company, Sussex, Wis., installed this Allis-Chalmers Super-Seal open-type motor with silicone rubber insulation. The 300-hp., 440-v., 400-r.p.m. squirrel-cage induction motor drives a grinding mill to reduce limestone from pebble size to powder for fertilizer.

The thermal stability of its insulation enables the machine to withstand high temperatures, shock and vibration, and abrasive dusts. The motor has various new design features, including pre-stacked rotor, new type fan blades, and a single "bulls-eye" type of oil ring bearing inspection port.

The mill and motor are mounted on individual concrete foundations sunk to bedrock and separated by heavy fiber sheets. A special coupling minimizes transmission of vibration. (363)



● Lipe-Rollway Corporation has expanded its DPB clutch line to include a complete range of direct-pressure, heavy-duty clutches for truck, tractor, and industrial use. Designed for on- or off-the-highway equipment, the new models include 12 in., 13 in., 14 in., and 15 in., either in single or two-plate construction. Torque capacity runs from 200 to 1,400 ft. lb. (364)

"WE DRILLED 300′ TO 500′ PER REGRIND . . . GOT 10 TO 12 REGRINDS PER BIT WITH TIMKEN® CARBIDE INSERT BITS"

Special report from
Henry J. Kaiser Co. and
Raymond International, Inc.

LOCATION: HOWARD A. HANSON DAM, ON GREEN RIVER, EAGLE GORGE, WASHINGTON

Operating conditions: basalt and sandstone

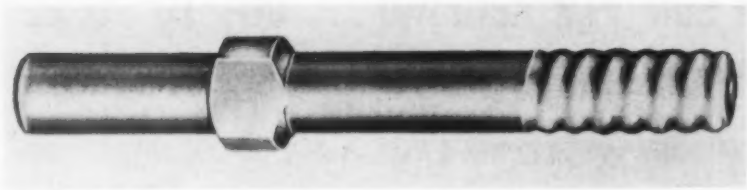
Here's another project where Timken® carbide insert bits proved their exceptional long life and fatigue resistance. In construction work at the Howard A. Hanson damsite, Henry J. Kaiser Co. and Raymond International, Inc. used 143 drills. The drilling rate was 24″ to 36″ per minute. Hole depths drilled ran up to 40′. With Timken carbide insert bits, they drilled 300′ to 500′ per regrind, got 10 to 12 regrinds per bit—made important savings in drilling costs.

Which Timken Bit should you use?

In hard, abrasive ground, use the Timken carbide insert bit for greatest economy. In softer ground, use the low-cost Timken all steel multi-use bit. Both bits are interchangeable in the same thread series; you can switch bits as the ground changes. Dozens of different Timken bits fit the same drill steel. And both types are made from Timken electric furnace fine alloy steel, have special shoulder unions to protect threads against drilling impact. Let us help you select the Timken bit best suited for your job. The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*

TIMKEN®
removable rock bits

Enter 63 on card, page 173



● Brunner & Lay rope thread striking bars are made of alloy steel and feature heavy-duty design for deep rock drilling.

They are available in all popular shanks and thread sizes, with rope or standard threads, with or without ring seals. (365)

Screen Story...

Mr. Glenn Smith, partner in Industrial Roofing Rock, San Bernardino, uses two Overstrom Screens to produce high-quality white limestone for architectural and fine plaster products. One of the two 3' x 10' double-deck machines is equipped with dust enclosure and ball cleaners to produce 16 x 40m. and minus 50m. products efficiently and without blinding.

Loves tough going! Overstrom Vibrating Screens are *quality* equipment designed and built to out-perform any other machine at any given job. Plan for an Overstrom in your next installation. You'll see the difference in higher screening efficiency and a better product . . . (Like to see more pictorial examples of *"Overstrom On The Job"*? Drop us a line and we'll add your name to our mailing list.)

OVERSTROM VIBRATING SCREENS

OVERSTROM & SONS, INC • 2213 West Mission Rd • Alhambra, California

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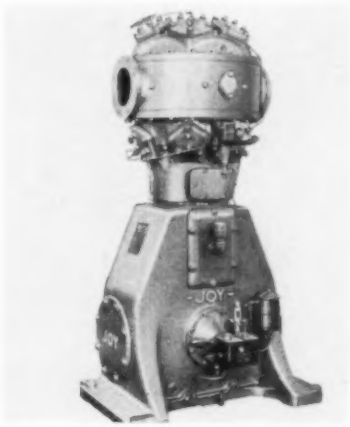
● Mounted on the discharge end of a storage conveyor, Stephens-Adamson's Swivel-Piler will throw material in any direction over an arc of 270 deg.

A Swivel-Piler, consisting of a centrifugal thrower unit complete with hopper and swivel-joint, can be

mounted as a unit beneath the discharge end of practically any portable or fixed belt conveyor. It is available for conveyor mounting in 10 in and 16 in. wide belt sizes.

The thrower has an endless, high-speed conveyor belt which operates on centrifugal action principle. Material traveling at a high speed is thrown from the unit in any desired direction. The trajectory of material can be raised or lowered from 8 deg. to 40 deg. by an operating adjusting lever. (366)

● Joy Manufacturing Company has added a new vertical, single-stage compressor to its line of heavy-duty air compressors. The machine, desig-



AN EDITORIAL REPORT on hauling methods at Anna Quarries, Inc., digested from the September, 1959, issue of "Pit and Quarry" magazine.

Anna Quarries MODERNIZES HAUL FLEET WITH 15-TON DUMPTORS

"Nearly a half century of operation has not lulled the management of Anna Quarries, Inc., Anna, Ill., into a complacent attitude, nor put them in a rut. This 300-t.p.h. plant, one of the largest in southern Illinois has from time to time undergone revision, and it has been equipped with the most efficient operating units available."

Quarry depth: 150 to 175 feet

"Latest step in the continuing improvement program involved quarry and plant feed operations. In view of many years' operation, the quarry is now 150 to 175 ft. deep. Within the last 10 years, the company has acquired a number of 8-ton capacity model 60 Koehring Dumptors." (The Dumptors haul quarry-run stone from shovels to a hopper at intermediate quarry level. From there, a steeply-inclined cableway system carries stone to top of plant.) "Last year, due to further deepening of the quarry, the hopper and cable-way system were moved down another 50 feet."

20% adverse grades

"At that time, experiments were conducted in interest of gaining more haulage capacity. None proved to have the speed and mobility required to negotiate the 20% grades in the confined area, or the limited room for maneuvering at hopper ramp. The latter condition, in particular, focused attention of management on the potential of newer model 100 Koehring Dumptors (15-ton capacity), which, with pivoting seats and dual steering wheels and controls, permits the driver to operate in either direction with ease and speed."

7 Dumptors in quarry fleet

"Two 15-ton units were acquired early in 1959, and put to use in widely separated sections of the operation. One new Dumptor joined the five older, smaller-capacity machines in the quarry, and the other is used at the top for stockpile rehandling. The haulage units transport material up a series of ramps to the hopper, where they discharge via free-fall gravity dump (older machines), or by either free-fall or controlled gravity dump on the newer machine. From the hopper, rock is transferred into cable-cars for transport to top of plant."

P & Q SEPT., 1959

15-TON DUMPTOR facts at a glance:

- **Pivoting seat, 2-way controls**
- **24 mph speed, either direction**
- **constant-mesh transmission**
- **Hydraulic clutches for easy speed-range selection**
- **Torque-converter drive**
- **Power steer; 4-wheel airbrakes**
- **30,000 lb. payload capacity**
- **28½% gradability**
- **Instant, or controlled dump**

How about a Dumptor demonstration on your work? Get in touch with Koehring distributor today — or send coupon for facts-by-mail!

To: Koehring Division, 3026 W. Concordia, Milwaukee 16, Wis.
Send us ☐ *literature* ☐ *specs. on 15-ton 100 Dumptor®*

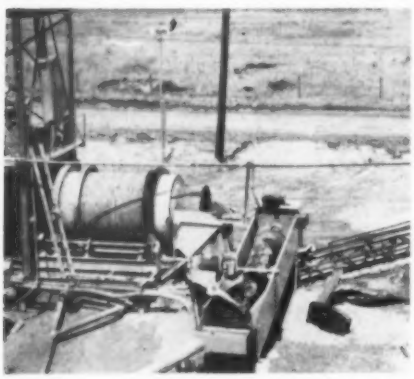
NAME ..... TITLE .....
COMPANY ..... DIV. .....
STREET ..... PQ K20
CITY, STATE .....

KOEHRING DIVISION OF KOEHRING COMPANY • Milwaukee 16, Wis.

Mickelson Corp., Oxford, Mich.

ELIMINATES SHUTDOWNS WITH AN EAGLE "SWINTEK" DREDGING LADDER!

Mickelson Corp., aggregates producers, report that "regardless of material encountered in the deposit the "Swintek" gives continuous production." The traveling chain passes over the intake nozzle continuously thus acting as a screen so boulders, stumps or debris cannot get in and clog the suction line or damage the pump. Cutter bars at intervals on the chain agitate the deposit, carry boulders up the ladder and dump them away from the pumping zone and cut through clay stratas where they exist. Mickelson dredges to a depth of 60'. Pump is 12". Average of 400 tons of material per hour are dredged. An Eagle "Swintek" quickly returns its cost in increased production. Eagle also builds complete, modern all-steel dredges. Send for Catalog 83. Eagle Cutter Head Dredging Ladders described in Bulletin 156.



Mickelson Corp. also uses an Eagle Single Screw Coarse Material Washer-Dewaterer to finish cleaning of material from a rotary scrubber. It is doing a very satisfactory job. Producers all over Michigan as elsewhere are profiting from Eagle's years of experience and sincere service. Ask for Washer Catalog 58.

SINCE 1872

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EIW EAGLE IRON WORKS

FACTORY-TRAINED DISTRIBUTORS EVERYWHERE

Enter 66 on card, page 173

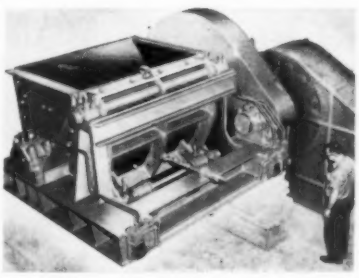
nated the WG-9H, has piston displacements from 633 to 1,630 c.f.m. with maximum pressures to 125 p.s.i. and horsepower ratings to 150.

The WG-9H now gives Joy three basic single-stage compressor models, increasing the number of sizes to 20 which include 5-, 7-, and 9-in. piston strokes. **(367)**

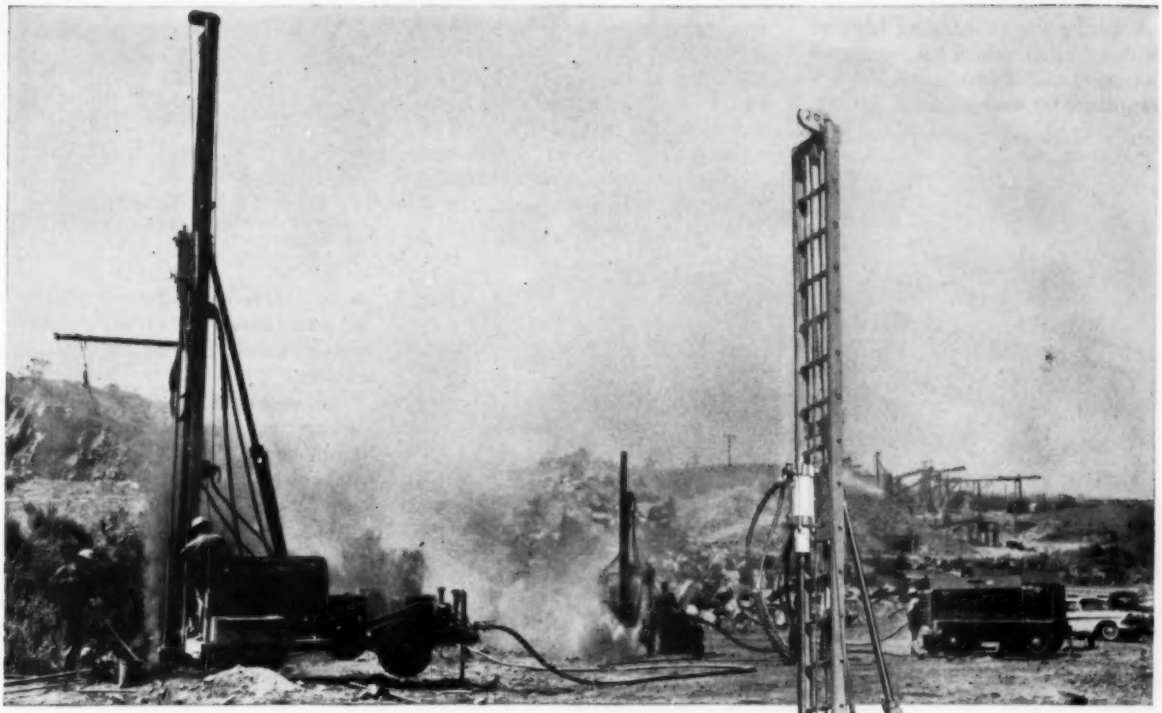
● Massey-Ferguson Industrial Division introduces the Model 65 Utility tractor, a 54.5-hp. unit designed to handle a variety of power-matched attachments, including Massey-Ferguson's Davis loader, backhoe, and scarifier-scraper.

Features include a dual range transmission with six speeds forward and two reverse, the Ferguson Sys-

tem with hydraulic draft control for three-point attachments, and a two-stage industrial clutch that permits operation of the Ferguson System and P.T.O. when the tractor is not in motion. It also has a new, heavy-duty front axle to withstand torsional stresses applied in rugged loading and lift jobs. Power steering is standard equipment. **(368)**



● A single-roll crusher, known as the Hercules, has been announced by Pennsylvania Crusher Division of Bath Iron Works Corporation. According to the manufacturer, low operational and maintenance costs



BIG HOLE DRILLING CAN REDUCE COSTS AT YOUR QUARRY

with the JOY TWM-5 CHALLENGER DRILL

The Joy TWM-5 Challenger carries TM-500, TM-550 or TM-600 drills . . . the most powerful percussion machines in their class. Mounted on the industry's most stable carrier, these drills normally sink 3½" to 5" holes to depths of 100 feet or more, and under certain conditions can drill holes up to 6" in diameter. Large holes, combined with fast drilling, reduce total drilling cost per ton of rock to a minimum.

The TWM-5 carrier adds extreme flexibility to the drill. Mounted on rubber tires or crawler treads, the TWM-5 moves quickly and spots holes at any angle from the vertical to toe holes 10° below the horizontal. Large air motors provide enough tramming power to tow a portable compressor, and are independently controlled for tractor-type steering in close quarters. All movements of the drill tower are hydraulically powered, and three hydraulic jacks quickly level the machine and stabilize it for drilling. A dust collector may be mounted directly on the carrier. All controls grouped for easy one-man operation.

This combination of powerful drill and fast moving carrier gives you large-diameter, deep holes at lowest possible cost per foot. Get complete details; write for bulletin 1017-26.

EQUIPMENT FOR QUARRYING . . . FOR ALL INDUSTRY

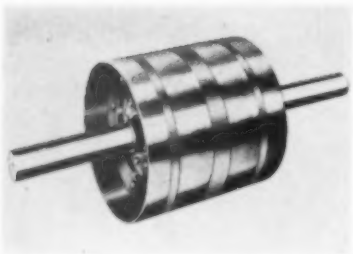
JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

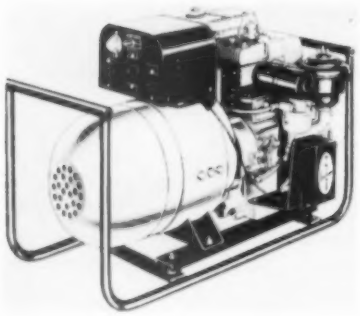
Enter 67 on card, page 173

are among the outstanding features of this crusher, which has been used in cement mills and other rock crushing plants for several years. (369)



● Stearns Magnetic Products has extended its line of Indox V permanent magnet pulleys for tramp iron removal to include 30-, 36-, 42-, and 48-in. diameter sizes for such heavy-duty applications as mining operations.

Indox V ceramic magnet material, report Stearns engineers, provides pulley performance equal to that of the electromagnetic types and at lower cost because they no not require coils, rectifiers, switches. (370)



● Three 60-cycle, 3,600 r.p.m. portable electric plants, featuring an "Econ-o-mizer," designed to reduce noise, save fuel, and increase engine life, have been introduced by Winpower Manufacturing Company.

The Econ-o-mizer on all three units—1,500 watt, 2,500 watt, and 3,500 watt—permits the plant to idle until a load of 100 watts or more is applied; at this point it revs up to operating speed and voltage.

Model G1536BPI weighs 112 lb.; Model G2536BPI, 173 lb.; and Model G3536BPI, 221 lb. Standard equipment on all models includes a stop-switch; pilot light; vibration dampers; a rope or recoil starter; two 15-amp. grounding type receptacles; one 30-amp., 3-wire twist receptacle (2,500 and 3,500 watt models); and a carrying handle or dolly. All units are powered by 4-cycle, air-cooled Briggs & Stratton engines. (371)

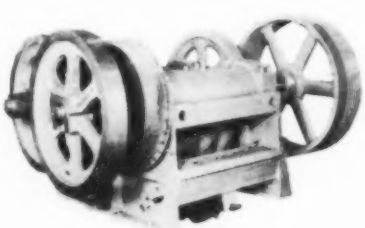
● The J. I. Case Company announces a 6.5-cu. yd. self-loading scraper.

The unit, Model S-20, has been developed for those dirt-moving operations if the cost of moving big equipment in and out is more than the cost of doing the work. (372)

● Universal Engineering Corporation has developed a matched jaw crusher with increased primary capacity and longer jaw life.

The crusher is available in two sizes—13 by 36 in. with a maximum jaw opening of 4 in. and minimum of ⅞ in.; and 18 by 36 in. with a maximum jaw opening of 5 in. and minimum of 1½ in. The jaw pitmans are timed and driven through enclosed cut gears to give positive operation and eliminate backlash and humping.

Combining the high speed of two moving jaws, Universal's overhead eccentric principle, and longer jaws that give better nip, the unit has increased efficiency and longer jaw life, according to the manufacturer. (373)



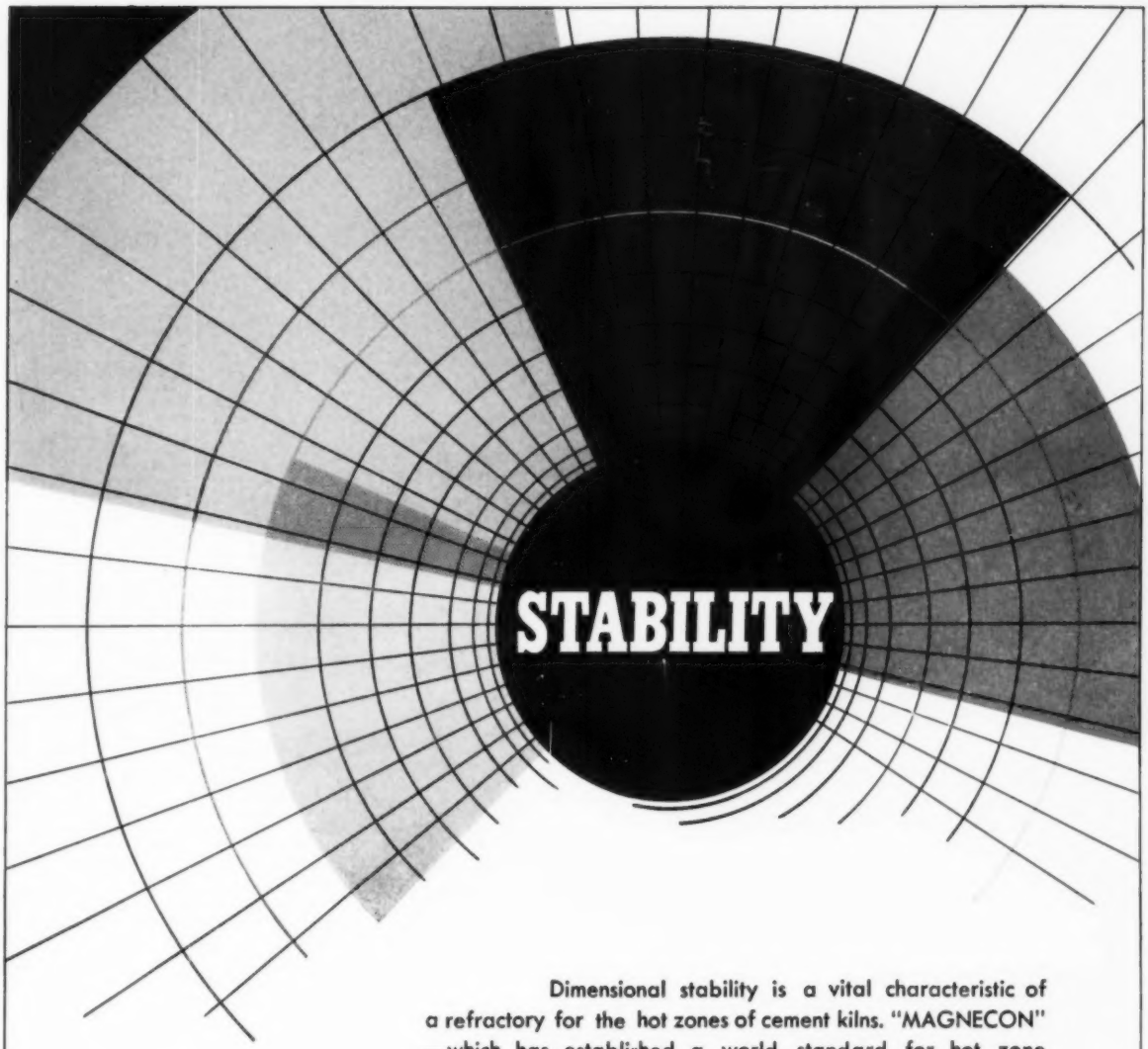
● Cline Truck Company is offering a 15-ton dump truck incorporating features usually offered only in larger models.

Among these features are the Cline driving and braking torques, transferred to the frame through four rubber-bushed drive pins. Exclusive with Cline is the use of rubber load-cushions in place of spring leaves on the rear axle suspensions, reportedly reducing maintenance and operation costs. (374)

● The new Lull 1½-cu. yd. loader, announced by Lull Engineering Company, features a longer wheelbase, dumping height of 10 ft., 6 in., greater traction, 4-wheel drive, and turning radius of 8 ft., 8 in.

Weight distribution is so planned and designed that the loader does not require ballast. It can handle 1½ to 2-cu. yd., has a 5-ton lifting capacity, can back up a 35 degree incline safely with a full bucket. The high rear axle oscillation of 26 in. is said practically to eliminate loss of traction on any type of terrain.

Safety features include the following: the operator's location—high and toward the rear of the machine; no moving parts around the operator; and a low front silhouette, making the bucket clearly visible. (375)



Dimensional stability is a vital characteristic of a refractory for the hot zones of cement kilns. "MAGNECON" —which has established a world standard for hot zone liners—has very high dimensional stability. "MAGNECON" was the refractory selected for seven of the largest cement kilns in the world, all newly completed or still a-building:

Miron Freres, Montreal, Que.
Kiln 550′ x 15′ diameter

Ciments d'Obourg, Obourg, Belgium
Kiln 525′ x 15′ 7″ diameter
Kiln 525′ x 14′ 7″ diameter

Dundee Cement Co., Dundee, Michigan
2 kilns 460′ x 16′ 6″—15′
—16′ 6″ diameter

Ciments Liegeois, Harcourt, Belgium
Kiln 475′ x 13′ diameter
Kiln 510′ x 14′ 5″ diameter

CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA

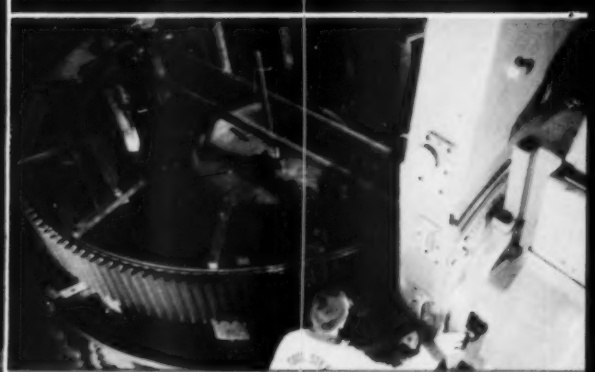
1908

TSP products

Continuous expansion of facilities maintain The Tool Steel Gear & Pinion Co. leadership in supplying the cement industry with products and services of superb quality. For example, Tool Steel's Maag gear cutter is the biggest in the world. It can cut gear teeth on gears with a 197" diameter and a 20.8" face. It can cut helical gears up to 190" diameter, 15 degree helical; and 177" diameter and 30 degree helical. High quality precision cutting, combined with a rapid delivery schedule, is a service that cement plants receive when they send their big gears to us for cutting or recutting.

"Tool Steel Process" hardened products are available for practically every key point in cement equipment, including pulverizers, mixers, drag lines, kilns, dryers, shovels, cranes.

Checking gear teeth for accuracy after cutting.



Big 11½ foot cement mill bull gear being recut at Tool Steel.

and service unlimited—

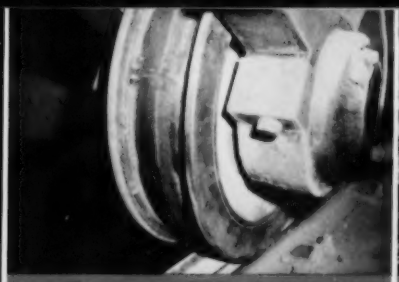
TSP Hardened Products are specifically designed, produced and guaranteed to out-perform, out-last any competitive product in the same service. A special hardening process achieves a file hard surface to the full depth of permissible wear. The core is refined for toughness and ductility. If you're interested in keeping your equipment running better and longer, write today for a free copy of our fully illustrated brochure "TSP Products for the Cement Industry."

THE TOOL STEEL GEAR AND PINION CO.

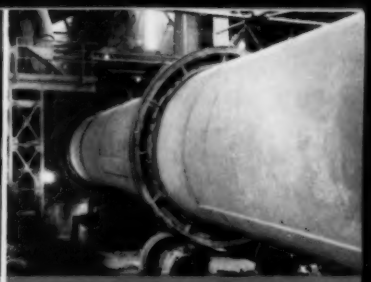
CINCINNATI 16, OHIO, U.S.A.

The Standard of Quality Since 1909 for Gears • Pinions • Rolls • Wheels and Other Hardened Products

Printed in U.S.A. AD 1043



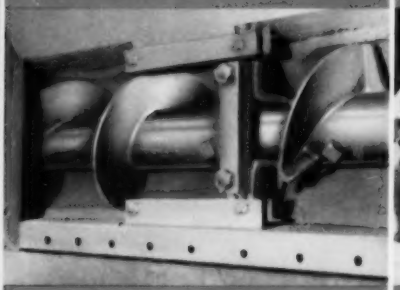
Close-up of TSP wheels on bucket crane after several years service.



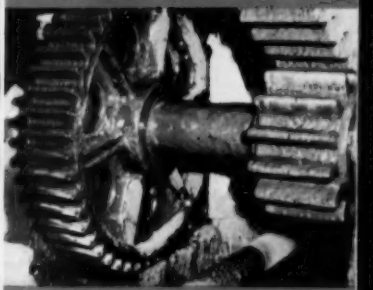
TSP trunnions and gearing on rotary dryer.

Close-up of TSP trunnions and shaft on kiln. Note smooth appearance after long service.

TSP compartment mill drive pinion. In continuous service since 1928 and still in excellent condition.

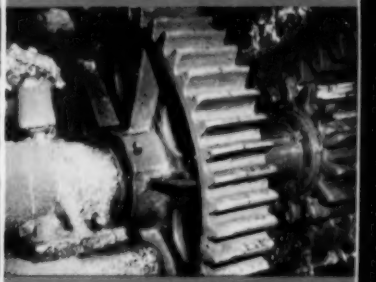


TSP gudgeons on screw conveyors deliver outstanding performance.

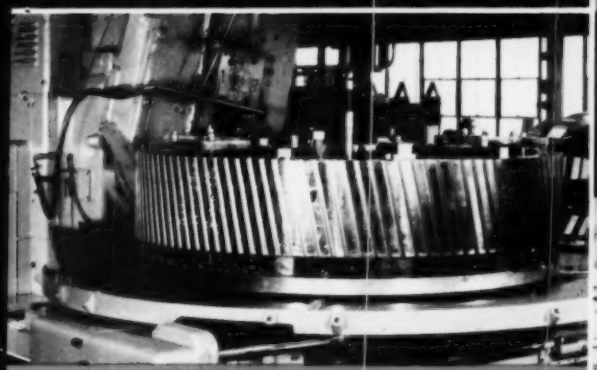


TSP main agitator drive pinion and intermediate drive bull gear after several years service.

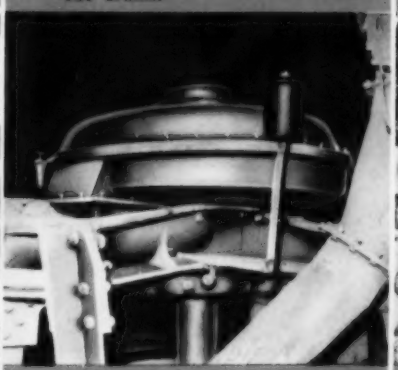
TSP main holding and closing drums on overhead crane. Note smooth and true grooves on TSP drums.



Rotary cooler showing TSP drive pinions and intermediate drive bull gear after several years service.



Helical gear being cut on Tool Steel's big gear cutter.



TSP Bevel gears and pinions on pulverizing mills.

TSP gearing on dryer.

last year more than 150 multiwall users reduced their packaging costs thru UNION-CAMP'S

BAG CONSTRUCTION

another FREE service of the ★5 *Star Packaging Efficiency Plan!*

How much could you save through UNION-CAMP'S 5-Star Packaging Efficiency Plan? Look at the record. Last year a single feature of this unusual service—bag construction—helped over 150 companies cut their multiwall costs. By tens of thousands of dollars!

Improved bag construction lowered the basis weight of a southern packer's multiwalls by 10 per cent. He netted $30,000 as a result. Another firm saved $42,000. A third, following UNION-CAMP'S recommendations for a new, stronger closure, largely eliminated breakage and netted packaging economies totaling $4.05 per M.

In addition to bag construction this comprehensive packaging program offers you four other important services. Bag design. Specifications control. Packaging machinery analysis. A survey of your plant. And it's free —regardless of the brand of multiwalls you now use.

Why not take advantage of it now by getting in touch with your local UNION-CAMP man?

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★ BAG DESIGN · BAG CONSTRUCTION · SPECIFICATIONS CONTROL · PACKAGING MACHINERY · PLANT SURVEY

Washington News Letter

(*Continued from page* 11)

savings, which are the principal source of new investment. The latter, in turn, are the principal source of economic growth.

The Democrats, of course, have a few other programs that are characteristic of their general philosophy of an expansive role for the Federal Government; these would provide a number of direct controls designed to control inflationary forces at their source.

Among these restrictions would be the revival of government authority to control the extension of consumer credit when installment buying threatens to get out of hand; the development of new controls which would limit the freedom of action, particularly of large corporations in their spending programs for plant and equipment, so that fewer such programs would occur in boom periods and more in slack periods; the avoidance of sudden changes in the volume of defense spending, so that this influence of government spending on booms and recessions would be eliminated; and, finally, the age-old exhortation to enforce the anti-trust laws more vigorously.

Of course, the question arises: "Is this the kind of stuff of which political campaigns are made?" The answer is probably "No." However, the fact that hard-headed politicians are willing to spend their time and effort on the development and defense of such propositions suggest that they believe these have value in at least some segments of the electorate.

It can hardly be the economists alone to whom they are appealing. After all, there are only a few thousand of them in the whole of the United States, and it would hardly pay to spend all of this time and effort to attempt to influence so small a vote. It must therefore be reasoned that at least the cheap money-tight money controversy involves a proportion of the electorate sufficient to have some appeal.

Moreover, in making this appeal, politicians are assuming a far higher level of economic intelligence among Americans than has generally been assumed to exist in the past. This is a hopeful sign. Perhaps they will soon be prepared to make the same assumption about political intelligence.

Labor Developments

(*Continued from page* 13)

should set a pattern in the railroad industry, the wage dispute, at least, would be settled without the threat of a major crippling strike.

It should be remembered, however, that union has agreed to submit any disputes over working conditions to such arbitration. If the railroad workers continue their agitation for substantial change in the work rules, the situation could approximate that which developed in the steel industry: that while the wage differences could have been settled, the differences over work rules appeared to be insuperable.

About the largest single agreement scheduled to expire in 1960 is the national contract covering 150,000 workers in the men's clothing industry. The history of labor relations in this industry has been so good in recent decades that no major difficulty is expected. Far more serious trouble may develop at the contract expiration dates in the communications industry, particularly in the telephone companies.

Here, the union is showing increasing strength. Recent agreements made in the communications industry reflect this strength and have, for the most part resulted in larger wage increases than previously. At the same time, however, the companies in this industry appear to be assessing that strength realistically; and therefore they have been generally making agreements without serious disruptions.

The next big problem anticipated is the renegotiation of the basic labor agreements in the electrical products industry, particularly with the General Electric Company and the Westinghouse Electric Corporation. Basic agreements in this industry are due to expire this fall.

It will be remembered that the previous contract expiration, particularly in connection with the Westinghouse Electric Corporation, involved a lengthy strike and a most serious disruption. There is great concern over the fact that the fundamental difficulties in this industry are far from settled and hence, that the end of 1960 may see serious labor difficulties here. If they occur, their timing will coincide with the Presidential campaign; and if there is a strike, it may well coincide with the presidential and congressional election. These developments would catapult labor relations directly into the center of the political scene.

It now looks as though there will be very little labor legislation resulting from the difficulties in the steel industry, principally because the Congress is disinclined to go into this unhappy matter in this political year. However, if there is another blow-up on labor issues in the electrical industry toward the end of the year, new, different, more drastic legislation to prevent crippling strikes may be at the very top of the list for passage by the Congress. It will be a new Congress and a new President, who will be under pressure for action. Such pressure at that time would be virtually irresistible.

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Made by the Original Deister Company Established 1906

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THE DEISTER CONCENTRATOR CO., INC. 911 Glasgow Ave., Fort Wayne, Ind.

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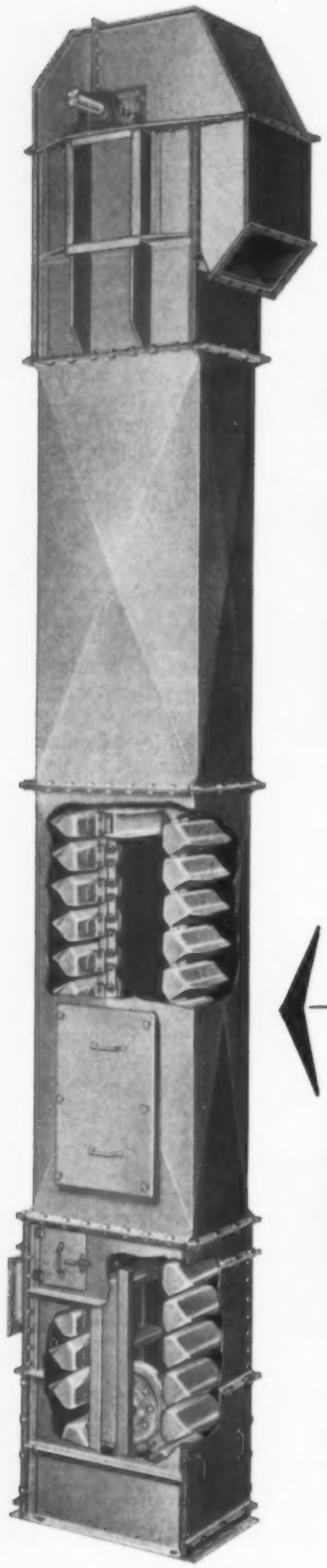
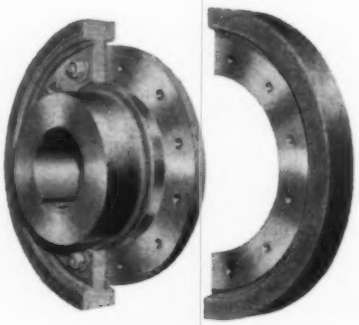


Link-Belt's NEW Type 14

a bear for wear with high capacity

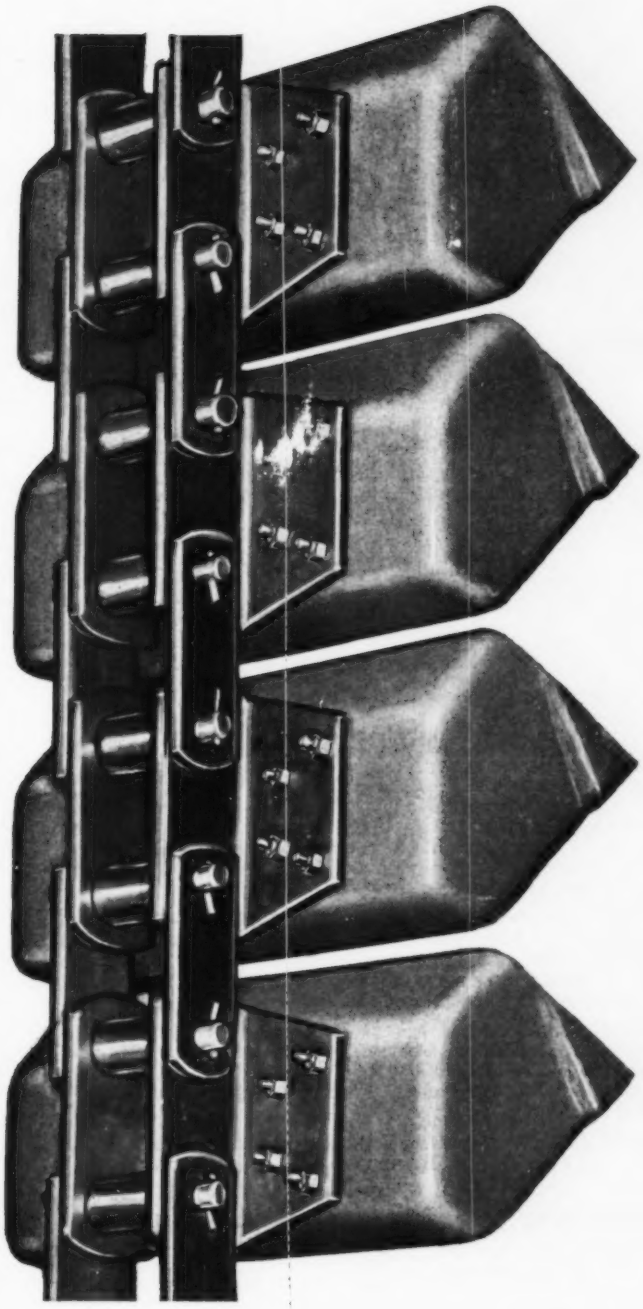
STRONG, RUGGED, EASY TO MAINTAIN—Entire casing of Type 14 is jig-welded, dust-tight, self-supporting construction. Casing hood and intermediate sections of 10-gauge steel; boot section of ¼" plate. Each section has access doors for easy assembly, inspection and maintenance.

LONG-LASTING BUCKETS AND CHAINS—New Style AC elevator buckets of malleable iron or Promal resist abrasive wear and rust. High front increases capacity. Famous Link-Belt SS bushed chain has sidebars of selected steel, machined for accurate pitch and tight fit of pins and bushings. Alloy steel, heat-treated pins and case-hardened bushings resist wear from joint articulation and sprocket contact.



TOUGH RIM SEGMENTS on both sprocket and traction wheel are made of cast steel, heat-treated for added strength and wear resistance. Hubs are gray iron. Segments are machine finished on both sides so they may be reversed to give additional service when one side becomes worn. Rim segments are simply unbolted, turned around, and replaced without removing chain, buckets, hubs, bearings or shafts.

Cement Mill Bucket Elevator...



Durable components contribute to years of dependable service

Handles the toughest abrasive materials like cement, clinker, crushed stone and similar materials—and comes out none the worse for wear! It's Link-Belt's new Type 14 centrifugal discharge bucket elevator—capable of continuous service at greater capacities than any other in its class.

Constant rough treatment is effectively resisted by 10-gauge steel casings. In addition, this elevator features jig-welded, dust-tight construction; buckets of malleable iron or Promal; single-strand SS bushed chain made entirely of tough steel with hardened joint parts. Close spacing of buckets with high front design results in maximum elevator capacity.

A full range of sizes to meet the demands of unusual as well as normal conditions. For complete information, call your nearby Link-Belt district sales office. Or write direct for a copy of Book 2714.

LINK-BELT

15,300

BUCKET ELEVATORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

Manitowoc...

pick of the pits for big capacity

DIGGING
LOADING
STOCKPILING

LOADING RIP-RAP in Dayton, Ohio, this 2½-yd. Manitowoc maintains high output under any conditions.

◀ DIGGING GRAVEL is the job assigned to a 4-yd. drag in Dallas. Equipped with a 100 foot boom, the rig averages 400 yards per hour.

DREDGING SAND AND GRAVEL in Ohio, the 6-yd. dragline shown reaches 45 to 50 feet below the water for gravel.

CHARGING BINS for a county asphalt plant, this 1¼-yd. Manitowoc handles 850 tons of material each shift.

There's good reason why Manitowoc shovels and draglines are the "pick of the pits" in every area of the rock industries. You can't beat a powerful Manitowoc for *long term* big output. And, you get more years of service from your investment.

The time-tested Manitowoc power train is the most simple in the industry. Every unit of horsepower carries a full work load — there's no wasted energy. The result of power-saving design is a work cycle that is faster, smoother, and more efficient. Pit production increases. Service and maintenance costs stay at the lowest level.

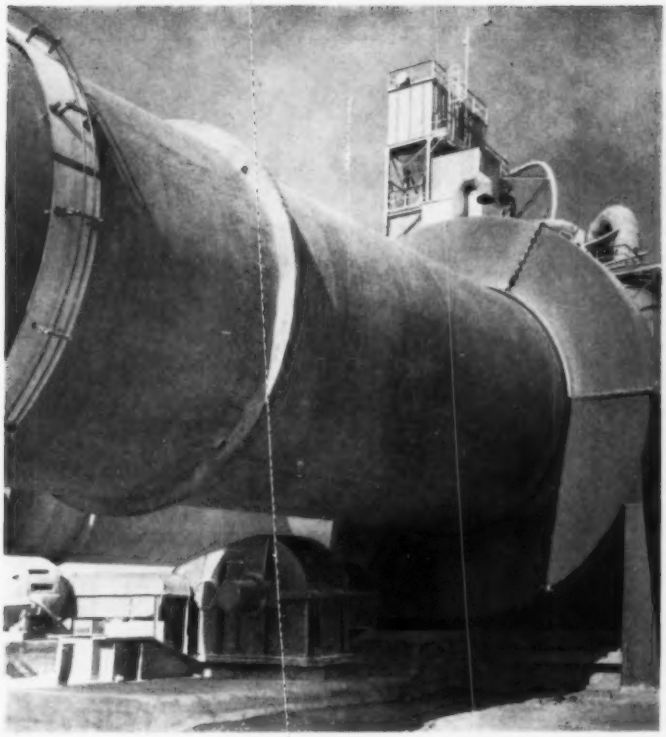
For loading rugged rock or abrasive aggregates, your Manitowoc has a high strength alloy steel boom welded in tubular shape; rigid, dual dipper sticks; and the solid stability that can't be matched by other types of material handling equipment. It's a quarry-proved machine — ready for anything!

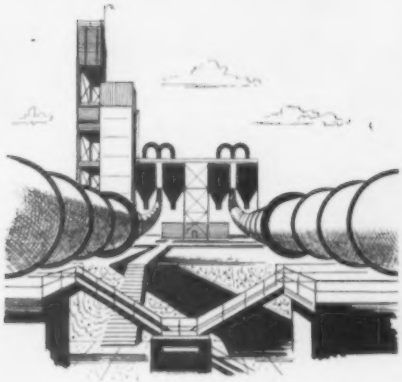
Make a point to get further information soon on the great *new* line of Manitowocs — call your helpful distributor.

Manitowoc

SHOVELS AND DRAGLINES 1¼ to 6 Yds.

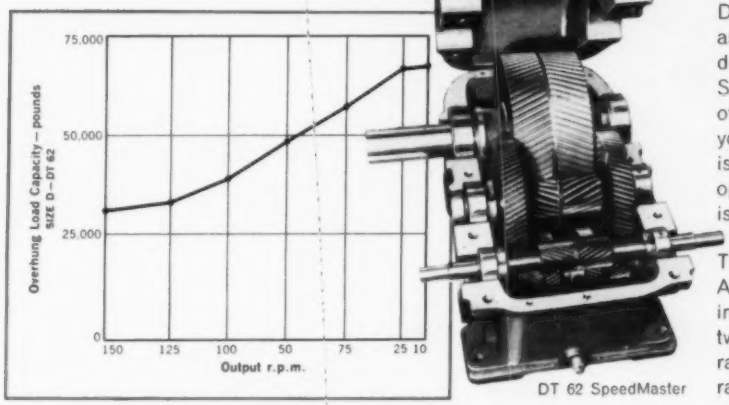
MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN





At a cost of 3.2 million dollars, Riverside Cement recently expanded its Oro Grande plant to increase clinker capacity by one million barrels annually. To achieve this, 5 smaller kilns were replaced with two 12′ x 310′ Allis-Chalmers rotary kilns. Western Gear SpeedMaster DT 62 parallel shaft speed reducers, driving these kilns, will help do the job.

on the long run...



DT 62 SpeedMaster

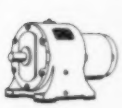
QUALITY COSTS YOU LESS!

Dynamic peaks from non-uniform loading such as with kiln drives, and heavy overhung load demands are common requirements for the SpeedMaster. Check the overhung load capacity of this DT 62 on the curve to the left to see for yourself one good reason why the SpeedMaster is a familiar sight on such key drives where operation is vital. Heavy overhung load capacity is a standard feature on every unit.

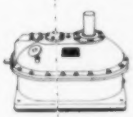
The DT 62 SpeedMasters are rated at 156 hp, AGMA Class I, with a ratio of 80.08 to 1 and an input speed of 1200 r.p.m. Auxiliary drives use two Western Gear BH 109 spiral bevel units rated at 16.3 hp, AGMA Class I, with a 17.23 to 1 ratio and an input speed of 1500 r.p.m.

WG INDUSTRIAL PRODUCTS DIVISION

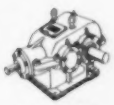
OTHER WESTERN GEAR POWER TRANSMISSION PRODUCTS


INTEGRAL GEARMOTOR

PARALLEL SHAFT REDUCER


VERTICAL SHAFT REDUCER

HIGH SPEED UNIT


RIGHT ANGLE REDUCER

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Industrial Products Division
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COMPANY_____
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Enter 77 on card, page 173

Many design features contribute to H-120's superior balance, stability and load carrying capacity. Low, level bucket position minimizes spillage in travel, promotes operator safety and fullest visibility.

New H-120 PAYLOADER®

Big tractor-shovel cuts operating costs and improves plant efficiency for

VALLEY SAND & GRAVEL CORP.

Long reach (3½-ft. ahead of front tires) and high lift (14½-ft. under hinge pin) let the H-120 heap-load trucks and bins, build higher stockpiles.

Loads 21-Ton Trucks In 2 Minutes

The Scottsville, N.Y. plant of Valley Sand & Gravel Corp., is a busy operation producing sand and gravel, washed and graded to specification sizes. Material handling in the plant involves moving wet, washed sand from the conveyor drop area to drying out stockpiles, and the loading of trucks with all types of aggregate. About 400 tons of material per hour are handled in these phases of the operation.

In order to improve plant operating efficiency and speed truck loading a big H-120 "PAYLOADER" was purchased last July. It now hauls all the wet sand to drying out stockpiles and in addition loads trucks from various stockpiles.

REPLACES CLAMSHELL CRANES

Formerly trucks were loaded with 2 clamshell cranes, one at each stockpile, but now one operator and the "PAYLOADER" load big 21 ton trucks with 3 passes, in about 2 minutes. Its speed and maneuverability enable it to service *both* stockpiles, trucks are never delayed, and in addition the full volume of wet sand is hauled to the dry-out stockpiles.

Valley Sand & Gravel Corp. officials are naturally well pleased with the greatly improved plant efficiency and the "PAYLOADER" operator likes the ease of operation, speed and splendid visibility of the bucket in every position.

This is just one of the many plants throughout the country in which this big H-120 "PAYLOADER" is cutting costs, speeding operations and increasing output. It will pay you, also, to check your plant . . . chances are a "PAYLOADER" of the proper size can effect important savings and increase your plant efficiency substantially. There are 8 "PAYLOADER" sizes to fit any plant requirement. Contact your HOUGH distributor or return the coupon for more information.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

The H-120 "PAYLOADER" gets full bucket loads of washed sand with its powerful traction and tremendous break-out force. Bucket tips back 40° at ground level.

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SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
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☐ Send data on Model H-120 "PAYLOADER"
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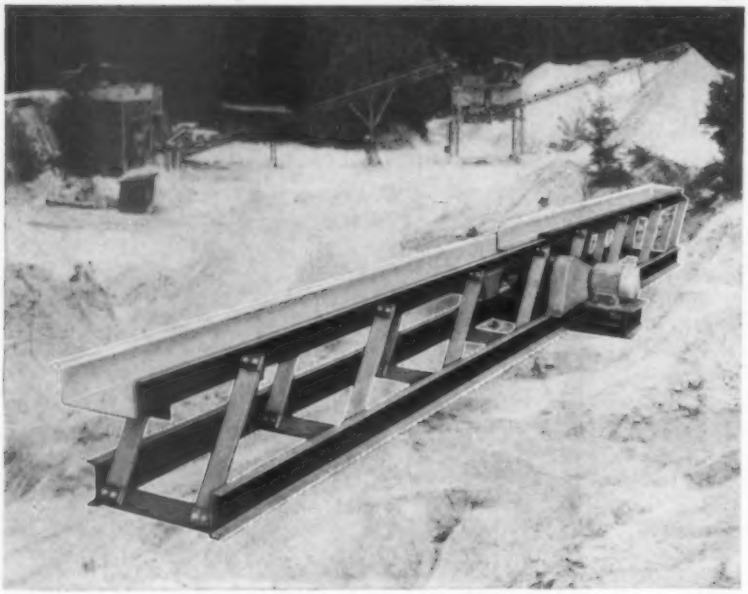
3-B-5

SYNTRON cost-cutting equipment of proven dependable Quality

for heavy tonnage conveying



SYNTRON Mechanical

VIBRATING CONVEYORS

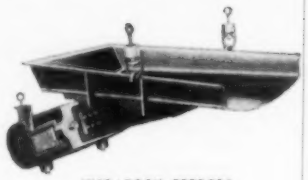
—multi-purpose units designed for high speed conveying of sand, gravel, stone and many other bulk materials in densities ranging from 5 to 400 pounds per cubic foot and in sizes from powder to large chunks.

They can be fitted with screen sections to provide both conveying and screening.
Low initial cost— low power requirements—simple construction assures maximum performance with low maintenance.

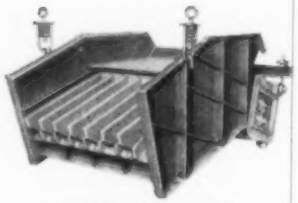
SYNTRON Vibrating Conveyors are available in lengths and widths to meet most requirements.

Write for free informative Catalog today

Other SYNTRON Equipment of proven dependable Quality



VIBRATORY FEEDERS



GRIZZLY BAR SCREENS

DRY FEEDER MACHINES

VIBRATORY PACKERS

TEST SIEVE SHAKERS

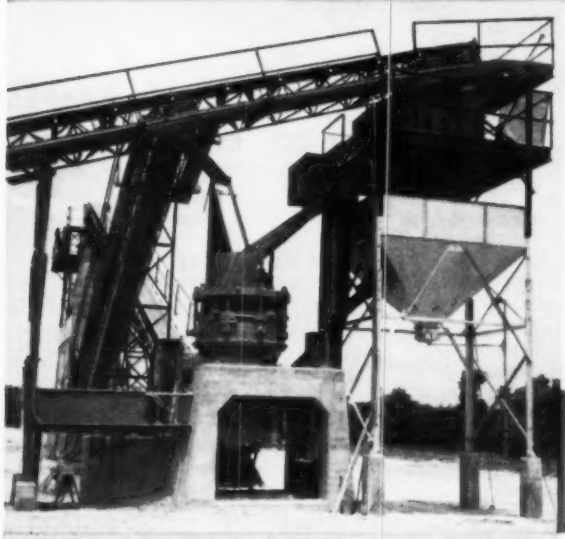
SYNTRON COMPANY

385 Carson Ave. *Quality Equipment Since 1921* Homer City, Penna.

Sales offices in principal cities in the United States and Canada—Agents in most Foreign countries

Start with A...for Alabama...

Primary Crushing Unit of Hodges & Company plant.



Scalping Screen and Secondary Crusher of the plant.

go through to W for Wyoming —there are Telsmith plants in all the fifty states

Anniston, Alabama, is the location of this modern, Telsmith-equipped quarry plant of Hodges & Company. With its 25 x 36 Telsmith Primary Jaw Crusher, and Telsmith 48-S Gyrasphere Secondary Crusher, production has reached 175 tons per hour making minus 1¼" crusher run. Tonnage is running from 125 to 140 tons per hour when producing minus 1" plus No. 4, and minus No. 4.

TELSMITH EQUIPMENT IN THIS PLANT

36" x 14' Intermediate Duty Apron Feeder • 25 x 36 Roller Bearing Jaw Crusher • 48-S Gyrasphere Secondary Crusher • 4' x 8' Double Deck Vibro-King Screen • 5' x 12' Triple Deck Vibro-King Screen • 30" x 132', 30" x 100', 24" x 81' Telsmith-BG Conveyors • Three Steel Bins with Bin Gates.

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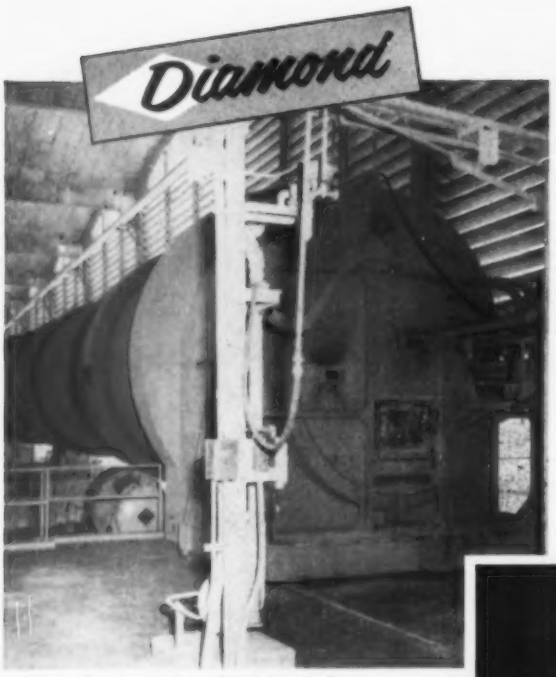

▲ View of cement kiln. "Utiliscope" Camera may be seen at right side.

▲ Close-up of "Utiliscope" Camera watching interior of kiln. Air cooled "Utiliport" protects lens against high temperature.

▼ Control Room. Operator sees kiln interior on TV monitor.

Modern Cement Plants Produce

MORE UNIFORM CEMENT CLINKER with DIAMOND "UTILISCOPE" TELEVISION

Camera Operates Efficiently in High Temperature Area . . . Provides Economy and Better Plant Layout

Close observation of the interior of the kiln is important in production of uniform high quality cement clinker. But to station an operator at an observation port on each kiln is inefficient use of man power. Also placing the instruments and controls in that location hinders good plant layout.

This problem was solved in this plant with a "Utiliscope", Diamond heavy duty Television System. A camera was installed on each of the two kilns to "see" the interior. Monitors in the air conditioned control room enable the operator to keep close watch on the burning conditions. He can continually check on the formation of clinker. Instruments and controls are also grouped in this room, so he can make immediate corrections when they are needed.

High ambient temperature (up to 2100°F at the viewing port) was no serious problem. The Diamond air cooled "Utiliport" provides adequate protection to the camera lens. The "Utiliscope" camera, which is built for tough conditions, is air cooled in this installation.

Diamond Heavy Duty Television is built to stand severe service. High temperature, dust, dirt, vibration, etc. do not impair its dependable operation.

This is only one of many ways in which the Diamond "Utiliscope" can save money, improve operation, and help produce a better product. It has been proved in a wide variety of plants and applications.

Explore the possibilities of "Utiliscope" for *your* plant. Write us for more information.

DIAMOND POWER SPECIALTY CORP.

LANCASTER, OHIO *Diamond Specialty Limited, Windsor, Ontario*

8297

saves $1500 PER MONTH with orton crane and dropball

Study reveals 19.96% savings over conventional plugger and explosive method

In a series of exhaustive tests in an open pit operation, a large mining corporation has recently determined that the cost of breaking rock can be cut by over $18,000 per year with the use of an ORTON Crane operating a dropball.

The tests considered all expenditures including cost of equipment, labor and maintenance.

Intangibles such as reduced air consumption, plugger replacements, decreased shovel maintenance, less time loss at the crusher were *not* included in the tests. These factors are considered worth many more thousands of dollars.

ONE IMPORTANT POINT WAS OBVIOUS IN THE REPORT: *The ability of a compact, mobile crane to stand up under this shattering work, continuously, shift after shift with little or no maintenance or down time is a highly significant factor in these savings!*

For facts about this remarkable crane—or other units up to 250-ton capacity, write for brochure.

Note easy accessibility to diesel engine. ALL ORTON cranes have smooth, shock-free, Torque-Control fluid clutch, finger-tip, air-operated controls, anti-friction bearings throughout—and are also available in *completely hydraulic* models.

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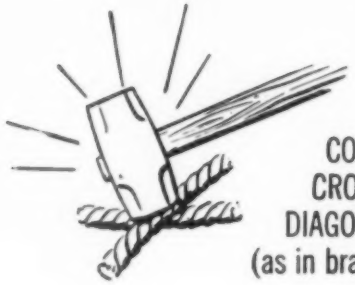
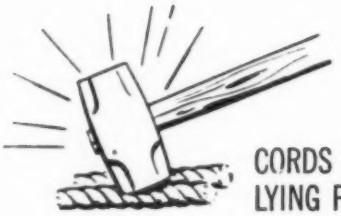
CRANE AND SHOVEL CO.
608 S. Dearborn Street CHICAGO 5, ILLINOIS
THE MOST POWERFUL NAME IN CRANES

ROYAL CORD AIR HOSE

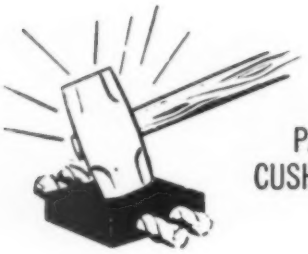
WHICH HOSE CONSTRUCTION CAN TAKE THE BEATING?



CORDS CROSSED DIAGONALLY? (as in braided hose)



CORDS LYING PARALLEL?



OR

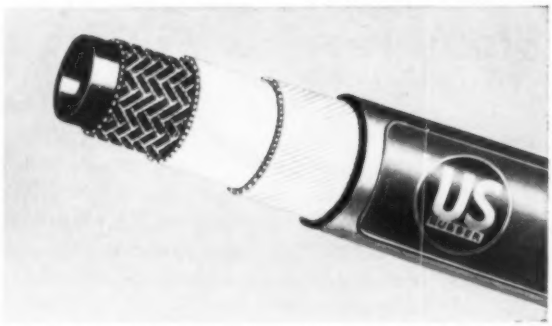
PARALLEL CORDS CUSHIONED IN RUBBER

as in U. S. Royal Cord Air Hose?

Yes, the exclusive "U. S." development—parallel cords cushioned in rubber can take and *do* take the *most* pounding. Observe how the cords run parallel in each of the two pressure-resisting plies; there is no crossing as in conventional braided hose. Each ply is separated by a layer of rubber—each cord is cushioned in rubber. This means there can be no friction created between cords, and therefore no chance of any shearing within the carcass.*

A hose with spiral plies is *always* stronger, because more strands can be used throughout the entire hose length than can be used in other constructions. *U. S. Royal Cord Air Hose has the same construction as that of a tire.* This is the exclusive quality you find under its cover.

The exclusive and outstanding features you get in U. S. Royal Cord Air Hose constitute one of the main reasons why



U. S. Rubber is the largest manufacturer of the widest range of industrial rubber products serving industry.

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When you think of rubber, think of your "U. S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.

**This same exclusive cord construction is also built into "U. S." water, steam, dock and fire hose.*

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WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

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The Editor's Page

Land Reclamation Pays— Financially and Otherwise

FOR some years nonmetallic minerals producers have been urged, in these pages and elsewhere, to do everything possible to reclaim and rehabilitate their exhausted deposits. They have been told that leaving such property in an unsightly condition and useless for any purpose creates poor public relations, and that this practice encourages the passing of restrictive zoning regulations.

Such regulations can put producers out of business, or at least force them to move to other locations with poorer materials and not so accessible to markets. For self-preservation, many producers have been conducting what they consider adequate conservation or reclamation programs, in some cases with little prospect of direct financial return. Comparatively few seem to realize that such methods could actually result in a profit, although many of them are actually so situated that this would be possible.

IT IS becoming increasingly apparent that land conservation and reclamation can be made to pay, and pay well. Land already worked out and suitably located can be put into usable condition with a good possibility of regaining the cost. Planned conservation of property being excavated can in many cases be made to pay off handsomely, both financially and otherwise. A nonmetallic minerals deposit can be so excavated that it will be suitable for an endless variety of uses. Such properties are now the sites of choice subdivisions, industrial areas, schools, churches, parks, swimming pools, etc.

The National Sand and Gravel Association was one of the first to recognize this growing threat and also one of the first to do something about it. For many years its members, and the industry in general, have been urged to practice conservation measures in order to insure their future.

CONSIDERABLE publicity has been given in these pages to what various sand and gravel producers and others have done along these lines. One of the first producers to be publicized, who was doing a real job and making a profit doing it, was Terry Carpenter, Inc., of Scottsbluff, Nebr. (See PIT and QUARRY, December, 1951, pp. 146 to 150, for details). Other producers who have outstanding programs of this kind include the American Aggregates Corporation of Greenville, Ohio, which began its reclamation program in 1932. (See PIT and QUARRY, October, 1955, pp. 80 to 91.) Startling results have also been achieved by the Grand Rapids Gravel Company of Grand Rapids, Mich., which began the rehabilitation of its worked-out properties in 1933. These firms have actually been able to get property rezoned for excavation, with the understanding that it would be put in condition for use for predetermined purposes; and this has been done at a substantial profit.

Every operator of an open pit or quarry should give serious consideration to the possibility of leaving his property in usable condition, if only for the sake of appearance. Remember that conservation and reclamation can help you keep the land you have; it may help you get the land you need; it will make friends of your neighbors; and it may pay off financially.

Walter E. Trauffer

ELECTRONIC COMPUTER

CONTROLS CEMENT PRODUCTION VARIABLES

Computer, X-Ray Analysis, TV Used for Blending and Kilns at Oro Grande

By HARRY F. UTLEY

THE Oro Grande, Calif., plant of the Riverside Cement Company, a division of American Cement Corporation, continues to attract attention in the industry with significant processing developments.

Early in 1959 it placed in operation a new crushing and blended-storage system which automatically samples, stores, blends, and reclaims raw materials, utilizing a 140,000-ton-capacity ground storage.[1]

Soon after the raw-material facilities began functioning, a similar sampling, layered-storage, and reclaiming system for clinker went into service, with storage capacity sufficient to supply the finish-grinding mill for more than a month's operation.

Late in the summer of 1959 an RW300 digital control computer was installed to indicate the most economical and efficient method of proportioning the materials in storage. There are seven classified raw materials in the piles, each representing a different cost, and of different analysis.

The computer is currently solving a 7 by 7 equation system which determines how to build the piles at minimum cost. Its electronic "brain" keeps track of the amount, chemical composition, and point of origin of these components. Periodically it calculates how much of what kinds of rock, shale, or other ingredients should be added; even factors such as hauling distances and quarrying costs at the various faces enter into these calculations.

Two highly-instrumented kilns have now been added and put into operation at Oro Grande, and the computer has been installed for convenience in the remote-control building serving these two kilns. A Flexowriter, similar in appearance to a typewriter, prepares the information on punched tape, which is fed into the computer. Technicians from Riverside and mathematicians at Thompson-Ramo-Wooldridge Company, supplier of the computer are now studying the variables on the two kilns to develop mathematical models which will eventually permit full computer-controlled operation of the kilns. Nearly one-third of the cost of manufacturing cement is incurred in the burning process, and the Riverside management is of the opinion that computer control of the kilns will be able to increase production as much as 8 percent and cut operating cost by a similar figure.

The addition of the two kilns supplements production of the five original kilns, to give the Oro Grande dry-process plant a new high capacity of about 6,000,000 bbl. annually.

Lack of room made it necessary to locate the new 10- by 12- by 310-ft. Allis-Chalmers kilns about 500 ft. away from the other kilns. They are high-level-mounted on reinforced concrete supports, and they can be fired by natural gas or oil. (Oil is used only in emergencies and in the winter.) The feed is *via* dual-cyclone preheaters through which the hot kiln exhaust gases pass. Feed material underflowing the preheaters is then recirculated by up-take ducts for still another pass through the pre-heaters, which ultimately raises the temperature of the feed within the range of 1,000 and 1,100 deg. F. before it finally enters the kilns.

The use of the pre-heaters, which were designed by Riverside engineers, thus permitted the use of the relatively short kilns (310 ft.), with excellent fuel economy. Gases exiting at the preheaters are de-dusted by combination Cyclo-trell and Cottrell electrical precipitators. Clinker is cooled in Fuller 741 horizontal-grate coolers equipped with Cyclo-trell collectors and clinker breakers. Then it is carried by skip and vibrating pan-conveyors to a belt conveyor, which inclines upward to a long belt-conveyor running from the other battery of kilns, *via* a sampling building, to the layered-storage piles.

The feature of primary interest, perhaps, with respect to the new kiln installation is the extensive instrumentation involved, permitting complete electronic control from a remote-control building. In the near future, data from these instruments will be logged and fed into the computer. The ultimate object is to bring the kilns under full computer control.

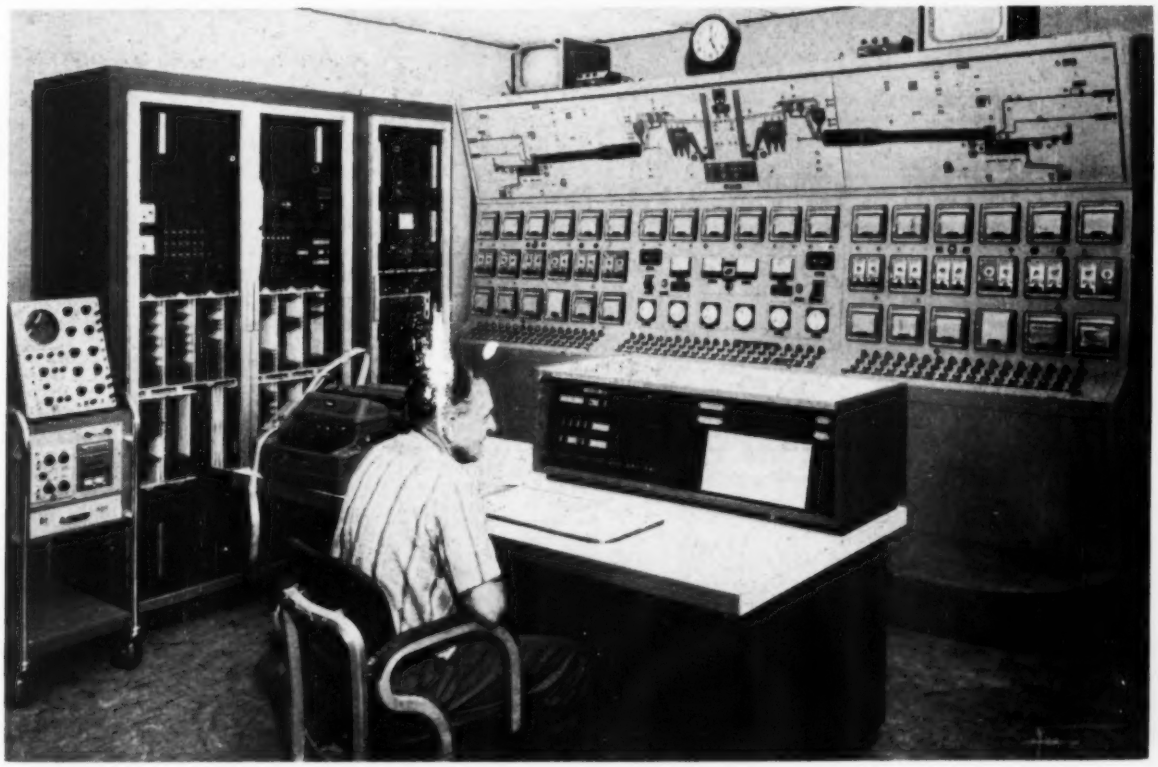
Foxboro Electronic Consotrol instrumentation was chosen to record and control burning operations; and all process variables, including temperatures, pressures, motion, motor speeds, gas analysis and gas-air ratios, are co-ordinated in the system.

Unlike the conventional firing floor, this one is clear of the usual control panels, switches, etc. Visual observation of the flame and burning

[1] *Riverside's New Automatic Crushing, Storage, Blending System*, PIT AND QUARRY, July, 1959, page 128.

THE TWO NEW KILNS, this view looking toward the two-stage preheaters at the feed ends.

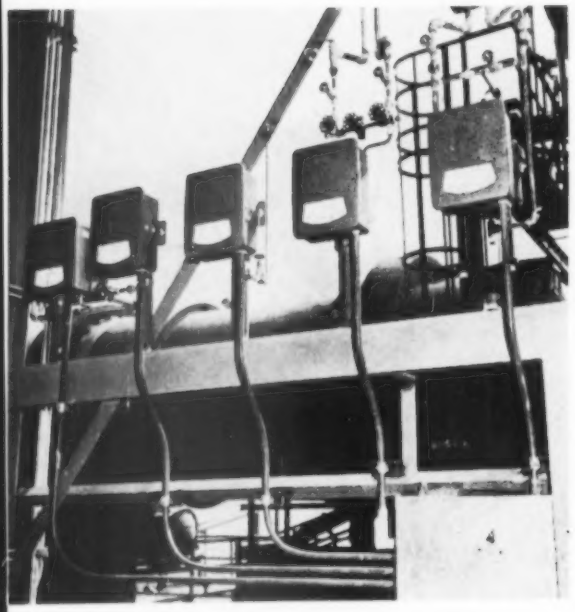
INSIDE THE REMOTE CONTROL KILN ROOM, with the semi-graphic console cabinet from which the new kilns are controlled and the television monitors above. The operator is seated at the computer desk; the computer is at the left, against the wall. The wheel-mounted instrument is a test device for checking computer operation. At the operator's left is the machine (resembling a typewriter) which prepares information on punched tape for feeding into the computer.



condition through the kiln-hood ports is taken over by a pair of Dage television cameras which constantly transmit pictures to a pair of Dage TV monitors (one for each kiln) located in the remote control building. The cameras, incidentally, are mounted within water-cooled boxes and employ lense filters to provide a sharp, contrasty picture on the monitors.

Two significant factors governed the choice of the instrumentation: (1) control from a remote location completely removed from the burning floor, and (2) instruments which would be compatible with computer control. This is believed to be the first use of Foxboro Electronic Consotrol instrumentation in a cement plant. Only electronic instruments can function effectively over the long transmission distances and in conjunction with the computer. Twenty separate control loops are involved. Measurements include kiln, feed, and cooler temperatures; fuel and air flows; hood and under-grate pressures; fan speed; cooler-grate speed; kiln-gas analysis (oxygen and combustibles); and feed weight. Other supervisory temperature and pressure measurements are either recorded or indicated.

FORCE-BALANCE FLOW TRANSMITTERS. An operator adjusts one of the various force-balance flow transmitters in the kiln-instrumentation system. In the background are the covered belt conveyors which carry clinker to the storage piles.



FIVE INDICATING MOTION-TYPE TRANSMITTERS on the kiln-firing platform. These indicate primary air flow, gas flow, hood pressure, gas supply-line pressure, and gas-pressure directly at the burner.

Instrumentation was developed to permit the kilns to be operated at a central optimum control temperature. Currently, studies are being conducted to ascertain the best control point. This may be near the burning zone, or at some other point within the kilns. The aim is to keep kiln speed constant and to make adjustments by varying the fuel and draft.

At the feed end, ABC conveyor scales regulate feed to the kilns, and the instantaneous feed rate and cumulative tonnage figures are transmitted to the control building, where they are recorded.

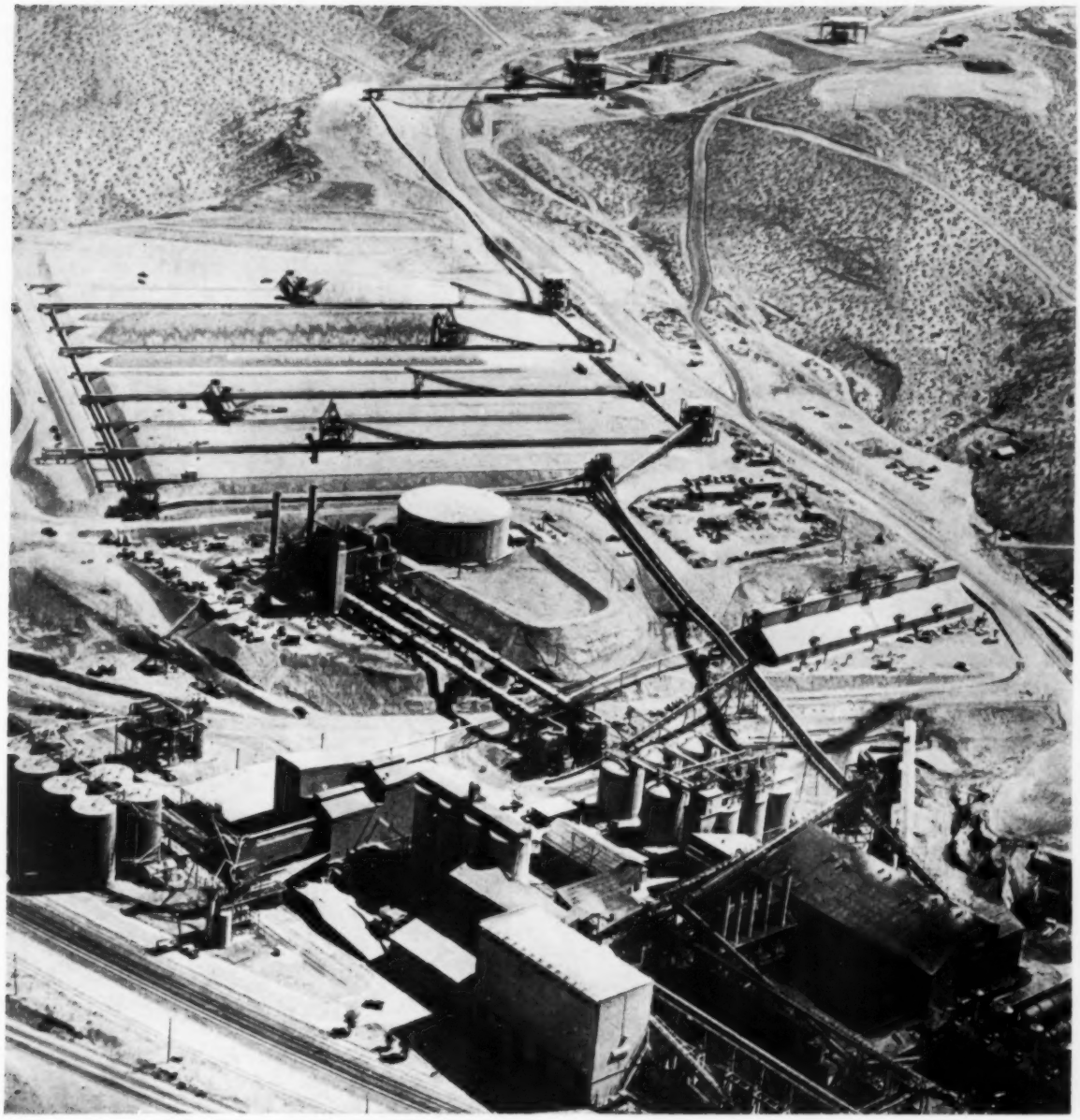
Currently, kiln temperatures are measured at two points—at 75 ft. and at 150 ft. from the feed ends. Thermocouples placed in wells at these points sense the temperature of the hot material. The wells fill and empty as the kilns revolve. Thermocouple EMF is carried to collector rings around the kilns and picked up by brushes for transmission to the control-house panel.[2]

Kiln operation is designed for one set-point; speed of rotation is not infinite but planned for four speed rates. The highest kiln speed (4th) can be changed by adjusting a V-belt drive between the kiln-drive motor and speed reducer. Each kiln operates on any one of four speeds, which can be selected in the control house. These speeds are 37½ percent, 50 percent, 75 percent, and 100 percent. The kilns are driven through Western Gear DT-62 Speed-Master parallel-shaft reducers with a ratio of 80.08 to 1.

Instead of utilizing louvres or dampers to regulate induced draft, this is done directly by regulating the fan speed, which may be anywhere in the range of zero to 1,200 r.p.m.

Primary air flow is measured in c.f.m. and is recorded continuously on the control panel, as a variable

[2]See *Automatic Kiln Control at Calaveras*, PIT AND QUARRY, May, 1958, page 80.

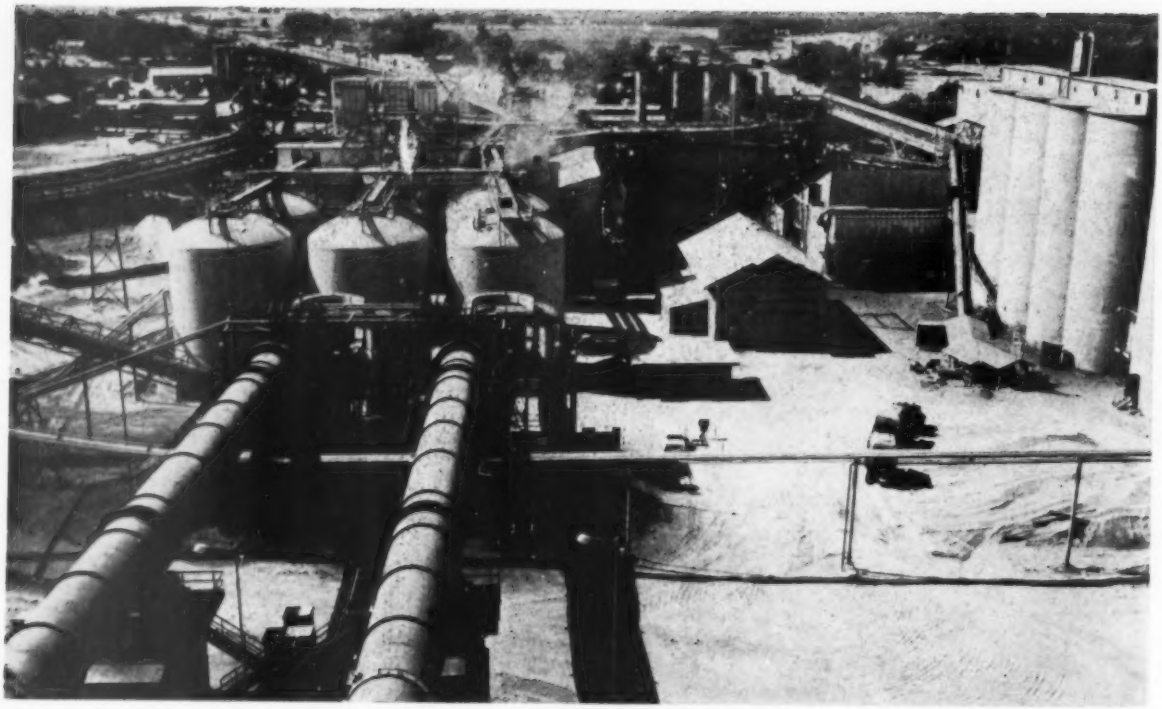


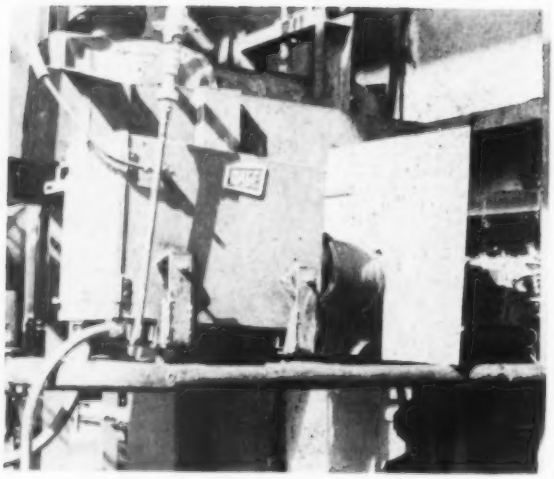
AN AERIAL VIEW of the entire Oro Grande, Calif., plant of the Riverside Cement Company, showing the raw material preparation, and raw material and clinker storage, blending, and reclaiming facilities in the background. In the center are the two new kilns which are also electronic-computer-controlled.

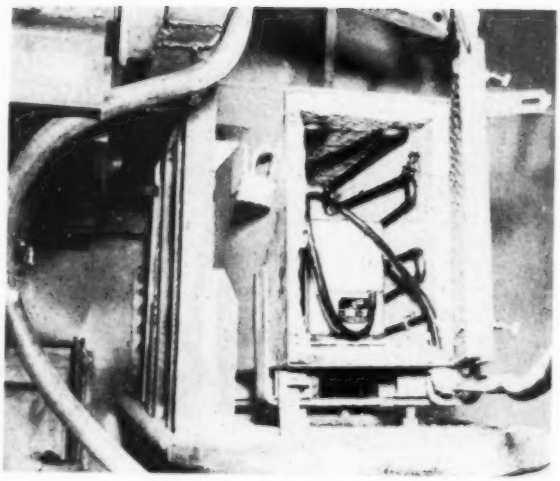
which ultimately may become an important control factor.

All the instruments—transmitters, recorders, indicators, controllers, and final operators—are fully electronic. All operate with compatible current signals over plain, unshielded lines. No vacuum tubes are used as the system is completely solid, with amplification achieved magnetically or by transistors. Measurements are converted at the transmitters to a proportional current signal for instantaneous transmission to the central control panel.

The panel itself is most interesting, as the picture on page 87 attests. The two TV monitors are located above the board, immediately above a Swanson FormoGraph layout spanning the entire upper area across the Consotrol panel proper. This graphic section depicts the burning-department flow-sheet, from feed bin to clinker discharge, separately for each kiln, No. 6 kiln at the right and No. 7 at the left. Approximately 30 green-amber-red lights signal conditions at as many strategic points. Should an abnormal condition occur at any point, an alarm buzzer sounds as the light turns red, and the trouble can be cor-





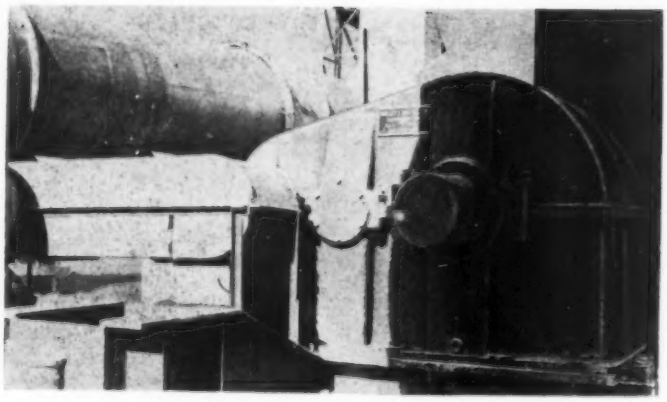


Top:
VIEW FROM THE TOP OF THE PREHEATER STRUCTURE, showing the two 310-ft. kilns. The small, flat-roofed building to the right of the blending-homogenizing tanks is the remote-control room for the kilns.

Middle, left:
TV MONITORING. One of the two television cameras which transmit pictures to monitors in the remote-control room.

Middle, right:
CAMERA PROTECTION. The dust-proof enclosure on the exterior of the kiln, with the rear door open to show the actual camera and cooling coils inside.

Bottom:
KILN DRIVE. Each of the two new kilns is driven by a 100-hp. motor through a speed reducer, as shown here. These reducers are rated at 156 hp., AGMA Class I.



rected remotely by pushbutton or otherwise right at the board.

The instrument section of the Consotrol panel is divided into three sections. Instruments on the left and right are in duplicate for each kiln while the center section carries recording and regulatory equipment common to both kilns. Panel instrumentation consists primarily of 1- and 2-pen recorders carrying strip charts delivering 30-day continuous records, and double indicating controllers. The controllers are mounted directly below corresponding 2-pen recorders. Each controller has a set-point knob and dial, a manual-automatic switch, and a measurement and deviation indicator. Stop-start pushbuttons and indicator lights extend across the entire console at the bottom. Other Foxboro instruments in the various control loops include the necessary transmitters, converters, flow-meters, square-root converters, and the like.

A battery of five motion-type transmitters is located on the firing floor. These transmit primary air flow, gas flow, hood pressure, and gas pressures at the headers and burners to the control room 200 ft. away. While each transmitter has an indicator dial for visual observation, control is not possible at the transmitters, since all regulation is done in the remote-control building.

The Oro Grande plant laboratory has pioneered in the field of X-ray spectrographic analysis of its raw materials. Currently the equipment is being replaced with an Autrometer, essentially the same as the laboratory-type equipment, but built and designed as a true production model which will be better adapted to utilization of its findings to computer calculation-control.

Riverside Cement Co. and the parent concern, American Cement Corporation, have general offices in Los Angeles. Bids were taken recently for the construction of a white cement plant, which would be the only one west of the Rockies, and erection is expected to start this spring. The white facility will rise adjacent to Riverside's existing portland-cement plant at Crestmore, Calif.

J. M. Kinard is president of the Riverside company. Production executives include David C. Honey, vice-president for manufacturing; Howard R. Starke, vice-president and technical director; and C. W. Cosby, general superintendent. John N. Sauer is plant superintendent at Oro Grande.

Appointments and Promotions

E. ALBERT BOYER has been appointed director of personnel and public relations at Dragon Cement Company, Northampton, Pa. (a division of American-Marietta Co.). His appointment became effective the first of this year, when his term of office as Northhampton County commissioner was completed.

HAROLD H. WHITE, former director of blasting practices and explosives research for Vulcan Materials Company, Birmingham, has been appointed consulting engineer in connection with the company's program covering the research on explosives effects at its various operations. The change was made to permit Mr. White more time for analysis of special seismograph recordings.

Three appointments have been made for Kaiser Refractories and Chemicals sales divisions. JACK T. PUTNAM has been appointed general sales manager of the Western Division, and will continue to have headquarters in Oakland, Calif., where he has been serving as western regional sales manager. HAL F. RANDOLPH has been appointed general sales manager, and ROBERT L. PETERSEN has been named assistant general sales manager of the Central Division; both will be located in Mexico, Mo. Mr. Randolph served as office sales manager of the Mexico Refractories Co., which recently merged with Kaiser.

J. I. Walker

Three major operations division appointments have been announced for Permanente Cement Company. JOHN I. WALKER, formerly assistant to John M. Garoutte, vice-president of operations has been assigned to the newly created post of general production manager for Permanente, assuming charge of production at the company's three Pacific Coast plants and all mainland U. S. distribution plants from Alaska to Long Beach.

W. E. Ousterman

Edward Bollinger

WALTER E. OUSTERMAN has been named to succeed Mr. Walker as Mr. Garoutte's assistant. EDWARD BOLLINGER has been appointed assistant production manager.

TROY SHELTON, J. R. SPEAR, and JEFF G. GOODNER of Dolese Bros. Co., Oklahoma City, have been elected by the board of directors to the positions of executive vice-president, vice-president, and director of public relations, respectively.

JOSEPH G. HALL has been named general sales manager for the Ruberoid Company of New York. He was formerly assistant general sales manager. RHYS L. STANGER has been named successor to that post.

Left to right: Arthur R. Alvis (Alvis Limestone & Concrete Products, Butler, Mo), chairman-elect of the board; Senator Allen J. Ellender Jr. (D., La.); W. L. Bryan (Bryan Rock Products, Inc., Shakopee, Minn.); and Robert M. Koch, Washington, D. C., president of N.L.I.

15th N.L.I.

meeting first under new setup—separate Agricultural and Crushed Limestone divisions

ANOTHER ON THE SPOT REPORT

AT its recent meeting in Washington, D. C., the National Limestone Institute, Inc., successfully merged the interests of the former separate entities of the National Agricultural Limestone Institute and the National Crushed Limestone Institute. The agstone and crushed stone members of these two organizations are now all members of the N.L.I., in one or both of its two branches, the Agricultural Limestone Division and the Crushed Limestone Division.

N.L.I. has one chairman, one secretary-treasurer, and one executive committee—all elected from the membership, to handle major common problems and matters—and a paid president and vice-president. Each division has its own vice-chairman, regional vice-presidents, and directors, to handle its individual problems; and also its own separate budget. There is also a Manufacturers' Division with an elected chairman. Judging from this first meeting, this new association is well suited to the needs of its members as it is designed to give centralized control of common objectives and individual control of separate problems.

This convention, the 15th of this group, was held January 19 to 21, 1960, at the Statler Hilton Hotel in Washington. It drew a record attendance of members, who stayed on to the final night for the annual reception and banquet. At this impressive event there were even more than the usual number of congressmen, and agricultural and highway officials.

The program offered was varied and interesting and gave each division time for its individual needs. There were joint operating and sales meetings and separate meetings for division business, promotion, and marketing. Special attention was given to the Agricultural Conservation Program and other farm matters, and to the National Highway Program.

The reports of Robert M. Koch, president of N.L.I., its secretary-treasurer, J. B. Mount, and the chairmen of the various committees of both divisions indicate that this organization is growing in membership of both producers and manufac-

Board of directors, Agricultural Limestone Division—Seated (left to right): W. L. Bryan, Minnesota (past-chairman of the board); R. O. Bemis, Ohio; W. J. Clark, New York (vice-chairman-elect); A. R. Alvis, Missouri (chairman-elect); Robert M. Koch, Washington, D. C. (president, N.L.I.); J. B. Mount, Tennessee (secretary-treasurer and past-president); M. R. Ackland, Illinois; and J. H. Riddle, Kansas.
Second row: R. W. Hunt, Missouri (past-chairman); D. Stussy, Minnesota (regional vice-president); R. T. Willingham, Georgia; Leonard S. Fry, Pennsylvania (past-president); W. M. Palmer Jr., Florida; R. M. Bridges, Illinois; E. L. Aussieker, Missouri; G. S. Harvey, New Hampshire (Manufacturers' Div.).
Third row: P. G. Potts, Kentucky; A. W. Mulzer, Indiana; R. C. Chapin Jr., Pennsylvania; E. B. Snead, Texas (regional vice-president); T. B. Stafford, Vermont; R. B. McNab, Tennessee (regional vice-president); H. C. Gray, Oklahoma (honorary director); and G. A. Zeigler, Maryland.

Convention Draws Record Crowd

By WALTER E. TRAUFFER

turers; that finances are in satisfactory condition; and that its membership continues to support association policies with respect to agricultural and highway matters. Polls of producers, farmers, county agents, etc., are used as a guide to these activities. Expanded budgets for 1960 were approved in order to finance increased activities of both divisions.

In his Greeting Luncheon address Mr. Koch pointed out some of the developments of interest to producers at this session of Congress, including the farm and highway program and percentage depletion. The President's recommendation that ACP funds be cut from $250,000,000 to $100,000,000 for 1961 will, he believes, meet with much opposition because of the continued drop in farm income and the further drop expected.

ACP, according to Mr. Koch, is doing much more good than the Soil Bank, which has actually increased our surpluses. A cut in highway expenditures was also recommended, but this move also is not justified by existing conditions and needs, he commented. The association, he said, is alert to anything affecting percentage depletion, but it is doubtful that the much-publicized revision of the tax structure will be made this year.

Coming Meetings The 1960 mid-year board meetings will be held in Chicago at the Edgewater Beach Hotel on June 13-14. The 16th annual convention will return to the Statler Hilton Hotel, Washington, D. C., January 17 to 19, 1961, and the board meeting will be held on January 16. No further commitments have been made, but there was some discussion of holding the 1961 board meetings at some suitably located resort area.

Manufacturers' Division The N.L.I. Manufacturers' Division held a breakfast meeting on Thursday, January 21. New officers were elected, including: Charles W. Mayer, chairman (Bradley Pulverizer Co.); William Plank, first vice-chairman (Arkell and Smiths); Wayne W. King, second vice-chairman (W. S. Tyler Company). Other business transacted included a discussion of membership expansion of the division.

1960 N.L.I. Officers Arthur R. Alvis (Alvis Limestone & Concrete Products, Inc.) the first chairman of N.L.I., was formerly vice-chairman of N.A.L.I. L. R. Falk (L. R. Falk Construction Company) was elected first vice-chairman and heads the Crushed Limestone Division (C.L.D.) William J. Clark (Munnsville Limestone Corp.) is second vice-chairman, and heads the Agricultural Limestone Division (A.L.D.).

Members of the N.L.I. executive committee, in addition to Messrs. Alvis, Falk, and Clark, are: R. O. Bemis (Basic, Inc.); W. L. Bryan (Bryan Rock Products, Inc.); Thomas E. Lalley (Bradford Hills Quarry, Inc.); Robert M. Patton (Plum Run Stone Div., Davon, Inc.); Powell G. Potts (Southern Stone Co., Inc.); John H. Riddle

Board of directors, Crushed Limestone Division—Seated (left to right): J. H. Riddle, Kansas (past-president); R. W. Cullor, Kansas; L. R. Falk, Iowa (Vice-chairman-elect); A. R. Alvis, Missouri (chairman-elect); Robert M. Koch, Washington, D. C. (president, N.L.I.); J. B. Mount, Tennessee (secretary-treasurer); T. E. Lalley, Pennsylvania (past-president); P. W. Seitz, Indiana (past-president). Standing: Cecil Pottorf, Illinois; R. E. Mayes, Missouri; Martin Valstad, Illinois; H. C. Wolfe, Ohio; G. S. Harvey, New Hampshire (Manufacturers' Division); Paul Frank, Indiana; F. H. Millen, Iowa.

(Riddle Quarries, Inc.); Paul W. Seitz (May Stone & Sand, Inc.); E. B. Snead (Texas Crushed Stone Co., Inc.); George A. Zeigler (M. J. Grove Lime Co., Inc.). Eight of these men are from A.L.D. and four are from C.L.D. as specified in the by-laws.

J. B. Mount (Maymead Lime Co.) was elected to a three-year term as secretary-treasurer. Robert Koch is president of N.L.I., and Samuel Omasta is vice- president.

The five regional vice-presidents for A.L.D. include the following: R. B. McNab (American Limestone Co., Knoxville, Tenn.); Arnold W. Mulzer (Mulzer Brothers, Tell City, Ind.); Robert J. Pleasant (Anchor Stone Co., Tulsa, Okla.); Thomas B. Stafford (Vermarco Lime Co., Proctor, Vt.); Donald Stussy (Stussy Construction Co., Mantorville, Minn.).

The five regional vice-presidents named for C.L.D. are: Fred K. Betts III (The Betts Quarry, Harrisonburg, Va.); Charles S. Bryan (Bryan Aggregates, Inc., Minneapolis, Minn.); R. W. Cullor (Cullor Limestone Co., Inc., Fort Scott, Kans.); Don L. McCullough (Alabama Aggregate Co., Birmingham, Ala.); and Roger E. Meshberger (Meshberger Stone Co., Inc., Columbus, Ind.).

Both divisions of N.L.I. also elected new boards of directors. Representing the Manufacturers' Division on both boards are: Charles W. Mayer (Bradley Pulverizer Co.) its new chairman; and P. K. Alvord (E. I. du Pont de Nemours & Co.) past-chairman; and George S. Harvey (Owens-Illinois, Multiwall Bag Div.).

The ACP Program According to Paul M. Koger, Agricultural Conservation Program Service, U. S. Department of Agriculture, there is a growing need for conservation of our agricultural resources. Changes in agriculture, production, marketing, and other phases are taking place at an increasing rate. Larger farms, more mechanization, increasing population, etc., make the conservation of soil, water, and woodland more important, and more widely known and understood by the public. The efficiency of agricultural production in this country has increased in this generation as much as, or more than during all the previous years of recorded history. Conservation programs, he said, have played an important part in this advancement.

The record of ACP in 1959 totals about the same as in 1958, said Mr. Koger. Some of the accomplishments of this agency in 1958 were as follows:

ACP assisted in applying soil and water conservation practices on 1,083,706 farms and ranches. The average amount of assistance per farm was $200.

"ACP assisted in establishing nearly 2½ million acres of conservation cover. In addition to protecting the land, this conservation cover keeps land out of intensive crop production for at least five to seven years, and, in some cases, permanently.

"Assisted in seeding almost ½ million acres of additional rotation grass of legume seedlings for soil protection. This keeps the land out of intensive use for at least two or three years.

"Assisted in planting ⅓ million acres of trees for forestry purposes, which permanently retired these acres from field crops and pasture.

"And ACP assisted in improving 1,800,000 acres of grass and legume cover on farmland, to extend its lifespan for conservation purposes. Much of this land, otherwise would likely have been shifted sooner to more intensive use.

"The effect of these shifts in land use is cumulative. The practices established will stay on and protect the land for periods ranging from the length of a rotation to permanently.

"Of course, grass and tree cover are only a part of the conservation investments farmers made with the ACP in 1958. Some of the other measures established with ACP cost-sharing, included:

"Over 63 thousand water storage reservoirs . . . . and nearly five thousand miles of water diversions and spreaders.

"Fifty four thousand acres of permanent sod waterways . . . and nearly 856,000 acres terraced.

"Almost ½ million acres of strip cropping . . . . nearly 1⅔ million acres of drainage for conservation farming . . . . and 1½ million acres of cropland tilled for temporary protection agains wind and water erosion."

The 1960 ACP program was then described by Mr. Koger. This program, already under way, was developed and is now in operation in over 3,000 counties. Each local program was developed by representatives of the interested agricultural and conservation groups in the county. He especially emphasized the following four important points.

"1. ACP will continue to contribute to needed land-use adjustments, which is important for production control as well as for conservation.

"2. We will continue to give

Leo L. Davis (Highland Stone Division, Davon Inc., Hillsboro, Ohio); C. E. Conklin (The Conklin Limestone Co., Inc., Lincoln, R. I.), A.L.D. director; Ellis L. Armstrong, Commissioner of Public Roads, Washington, D. C., one of the speakers; T. B. Stafford (Vermarco Lime Co., Proctor, Vt.), A.L.D. regional vice-president; and Floyd H. Millen (Valley Limestone & Gravel, Inc., Farmington, Iowa), C.L.D. director.

maximum assistance in speeding up land treatment measures needed to further watershed conservation programs sponsored by local people and organizations. Almost $9 million of 1958 ACP cost-sharing was utilized for land treatment measures in the 11 major flood-prevention watersheds, 55 pilot watersheds authorized by the Congress, and 124 Public Law 566 watersheds then authorized for operations, for which the Department of Agriculture has major responsibility.

"3. ACP resources will be used more effectively to assist farmers in low income areas with needed conservation practices as a part of the Department's efforts in the government-wide Rural Development Program.

"4. We will continue to emphasize practices with enduring benefits, especially those most important in conserving water."

The ACP policy on agricultural minerals, including lime, has been to share the cost of minerals only to the extent necessary to insure the sound establishment of grasses and legumes needed for conservation purposes, or to extend the life span of the cover.

In closing, Mr. Koger suggested that producers keep in touch with the Agricultural Stabilization and Conservation Committees in their counties. By exchanging ideas and understanding each others' objectives, producers, the committees, and the farmers will all benefit.

Extension Services "We need the limestone industry on our team," was the opinion expressed by George Enfield, extension agronomist (Soils) U. S. Department of Agriculture, in his address. Mr. Enfield is an active exponent of the need for lime in soils. Maintaining peak fertility is important to this and future generations, yet the use of liming materials remains far below our needs. Liming, where needed, pays for itself many times over, but the farmer profits only a fraction of what he could if he followed recommended practices. What the industry needs, he said, is more salesmen and more advertising.

The function of the Extension Service is to give usable information to farmers and to encourage them to use it. This work includes the following points: approved practices, including liming; development and use of natural resources; promoting efficiency in marketing and distribution; teaching management of the farm and home; development of leadership, etc. Mr. Enfield closed with a plea for closer co-operation between the Extension Service and the fertilizer and agstone industries.

Left to right: Whit Palmer Jr. (Dolomite Products, Inc., Ocala, Fla.), A.L.D. director; John M. Deely Sr. (Lee Lime Corporation, Lee, Mass.), past-president; George E. Nettels Jr. (John J. Stark Contractor, Girard, Kans.), A.L.D. director; A. R. Alvis (Alvis Limestone & Concrete Products, Butler, Mo.), chairman-elect of the board; and A. W. Mulzer (Mulzer Brothers, Tell City, Ind.), A.L.D. regional vice-president.

Agricultural Hall of Fame Plans for an Agricultural Hall of Fame, to be located 12 miles northwest of Kansas City, Kans., were described by Dr. A. Webster Tenny. This $5,000,000 project is intended to honor the American farmer and the agricultural "greats," and to serve as a center of information, education, and public relations. It is being supported by the government, colleges, states, manufacturers, farmers, youth groups, etc.

Buildings will include a Hall of Fame; a museum of sciences; a museum of farm and home to preserve the old for future generations; an educational section, which is important because the percentage of farmers is rapidly decreasing; a historic agricultural library; replicas of various types of buildings; an old Indian village; re-enactment of old crafts; demonstrations of farm practices, including soil conservation, liming, etc. There will also be facilities for meetings.

Farm Policies Criticism of some of the present farm policies was voiced by Congressman Jamie L. Whitten, chairman of the Sub-committee on appropriations for the Department of Agriculture, which has a key role in the determination of the funds for supplementing our nation's agricultural policies The speaker said that with only 12 percent of our population now on the farms and the other 88 percent depending on them for food, we should see that these farms are well taken care of. Other countries, like India, are examples of what happens to land and to people when farm income is too low. We were perhaps the most wasteful nation in this respect, but we woke up in time. Now, he emphasized, we must take even greater steps in the direction of conservation.

In order to encourage the farmer to conserve his land, he must be assured of an adequate income, and some must have additional encouragement and help. When government support was reduced, farm income went down and support again went up. Congressman Whitten said that the soil bank is not the answer. He believes that as land is taken out of production, sub-marginal land is put into production, increasing our output and surplus, and there is no way to stop this trend

The ACP program is, in his opinion, much more effective. He proposed that our surplus wheat should be made available to farmers who

cut production. Then when the surplus is in line, a new farm bill should be passed to limit production. He believes that Congress should pass first those bills which are necessary to the welfare of our country, and then the ones helping other countries to the extent that funds are available.

War and preparation for war are not responsible for prosperity, said Congressman Whitten; it is the effort put in that makes for prosperity. We should put the same effort into improving our country, and ACP is one way to do it; the soil bank is not, the speaker declared.

Future Highway Program A penetrating exposition of what is wrong with our highway program was given by Congressman Fred Schwengel of Iowa, active on the House Public Works Sub-committee on Roads. This speaker stated that the present shortage of funds for this program is due to the following: inflation; underestimation of traffic; local needs; increased prices; diversion to utilities, etc; and the addition of 1,542 miles to the original program.

He particularly criticized payments to utilities for the cost of moving their lines, as filling stations, motels, and others affected by the relocation of major highways are also adversely affected. From the standpoint of costs, he said that the aggregates industries are unique in the reasonable prices for their part in the program; these industries, he stated, have usually helped in keeping contractors' bids below estimates.

The investigation now being carried on by the Sub-committee on Roads is expected to save hundreds of millions of dollars. This committee is exploring all phases of the program and will concentrate on giving priority where needs are greatest, eliminating unnecessary construction, checking bridge standards, etc.

On the same subject, Ellis L. Armstrong, commissioner of roads, Department of Commerce, declared that although a 10 percent increase in receipts was expected in 1960, expenditures would be slightly under 1959, due to cutbacks. Highway location is a major problem as so many special interests attempt to exert influence. The supply of aggregates is also becoming a serious problem. Shortages of either fine or coarse aggregates are developing in parts of several states, including Colorado, Mississippi, Oklahoma, Florida, Kansas, Nebraska, New Hampshire, New York, Oregon, Pennsylvania, and Virginia. Mr. Armstrong stated that this problem could be minimized by using lower grade aggregates where they are suitable and using the best aggregates only where they are necessary. In closing, he emphasized that money spent for highways is not an expenditure but an investment in the future of this country.

Road Aggregate *Limestone as a Road-Building Aggregate* faces the problem of a growing scarcity of good materials in some areas, according to D. O. Woolf, chief, Concrete Section, Division of Physical Research, Bureau of Public Roads. In these areas materials must now be considered which were once thought unsuitable, he pointed out, and there are few objectionable characteristics of limestone which cannot be overcome. Foreign matter is usually clay, shale or silica. Shale usually occurs in seams which break up easily if they are thin but usually not if they are thick. Removal can be accomplished by specific gravity methods, and crushing down to the maximum of 1 in. helps. A high-silica limestone is reactive with cement; but this problem can often be overcome by mixing it with non-reactive aggregates, especially finely pulverized limestone.

Highway Research *Highway Research Activities* was the subject of Fred Burggraf, director of the Highway Research Board of the National Academy of Sciences. This board had just completed the biggest and best congress in its history, with delegates from all over the world in attendance. The expanded highway program and the many problems resulting from it and from the increasing volume of traffic are receiving the major share of attention. A new 5-year program will cover 19 projects, including better inspection of aggregates, more careful specifications, and improved treatment methods made necessary by the gradual depletion of the bet-

Left to right: E. R. Culbertson (Georgia Lime Rock Company, Albany, Ga.); Don M. Clark (Clark Limestone Company, Logan, Iowa), A.L.D. director; Martin Valstad (Valstad Quarry, Carrollton, Ill.), C.L.D. director; and Bob Graham (The Conklin Limestone Co., Inc., Canaan, Conn.).

Arthur R. Alvis (center), chairman-elect of the board, presenting distinguished service awards to Thomas E. Lalley (left), past-president of N.C.L.I., and W. L. Bryan (right), past-chairman of the board, N.A.L.I.

ter deposits. Mr. Burggraf stated that the board not only conducts important research, but also promotes the application of its findings and makes recommendations for their use.

The world-famous Ottawa, Ill., road tests have now been under way for more than a year, said Mr. Burggraf, and a huge mass of data is being processed. The volume of traffic has now been stepped up; and this phase of the program will end on July 1, 1960. Then there will be three months of special tests, including traffic involving military vehicles, followed by six to seven months of final calculations. The data will be completed about April, 1961, and results will be released soon thereafter.

Materials Handling The greatest savings in production costs in the future will be made through improved materials-handling methods, according to Arthur W. Fasold, Hewitt-Robins. Needed expert advice and improved equipment can be supplied by the manufacturers. An example is the standardized conveyor section, now available in a wide variety of lengths and sizes, which is interchangeable as to accessories. The rope conveyor now widely used in coal mining is even cheaper and has a future in our field, he believes.

Economies through higher belt speeds are now limited only by belt strength, and present maximum speeds of 850 f.p.m. could go up to 1,200 f.p.m. Deep troughing idlers are now practical for light materials, and stronger flexible belting will make this suitable for heavier materials.

Other improvements available, according to Mr. Fasold, are longer-wearing poly-urethane chute lining and lagging, rubber sleeves for return idlers, and spiral catenary return idlers to prevent buildup.

Minus ⅜-in. Screening *How Screen Cloth Can Best be Utilized in Efficient Screening of Minus ⅜-in. Material* was the subject of a paper by Robert Warner, Hoyt Wire Cloth Company. While there are no simple formulas for screening at this important size separation, Mr. Warner said that there are certain basic screening fundamentals which should be observed. Material on a screen becomes stratified, in the first 5 to 10 percent of the screen deck length, with the larger particles at the top of the bed. Under ideal conditions, maximum peak screening of the through material should be achieved in the next 20 percent of the deck length. As a result 75 percent of the screening is accomplished in 25 to 30 percent of the length, but it would require 75 to 85 ft. of screen in order to approach 100 percent screening efficiency.

The amount of near-size material present has an important bearing on screening efficiency, Mr. Warner stated, while particles 25 percent or more under and 50 percent or more over have little effect unless a screen is severely overloaded. In a series of tests with ¼-in. opening wire cloth and 3/16- to 3/8-in. grain sizes, feed containing 55 percent of near-size material could be screened only one-third as efficiently as feed with only 18 percent of near-size material.

In other tests with screens identical except as to length, a screen 2⅔ ft. long with 60 t.p.h. feed was 85 percent efficient; a 5⅓-ft. unit fed 140 t.p.h. of the same material was

Left to right: Don Stussy (Stussy Construction Co., Mantorville, Minn.), A.L.D. regional vice-president; Ray Cook Jr. (Ray Cook Construction Company, Ames, Iowa), A.L.D. director; T. K. Jones (Blountville Construction Co., Blountville, Tenn.), A.L.D. director; M. R. Ackland (Stoneridge Limestone Company, Rochelle, Ill.), A.L.D. director; and M. M. Green (Green Quarries, Inc., Carrollton, Mo.), A.L.D. director.

Left to right: Congressman H. R. Gross, Iowa; Congressman John Kyl, Iowa; Mrs. L. R. Falk; Congressman Charles B. Hoeven, Iowa; Mrs. Ray Cook Jr.; and Ray Cook Jr. (Ray Cook Construction Company, Ames, Iowa), A.L.D. director.

96 percent efficient; and an 8-ft. screen fed 160 t.p.h. was 92 percent efficient.

When surface moisture is under 2 percent, there is little blinding or adherence of particles to affect efficiency of screening; the use of sprays also helps. Distribution of feed across the deck is essential as is also thinness of the bed at the discharge end. A single-deck screen is most efficient, but it is usually not practicable. Speed of vibration, length of stroke, and slope are also factors which contribute to efficiency; and the variables should be adjusted accordingly whenever possible.

Efficient screening is dependent on the proper inter-relation of many factors, said Mr. Hoyt, and selection of the proper wire cloth is one of them. Before a specific opening is decided on, the most suitable type of wire must be selected. Spring grade stainless steel is advised where corrosion, or corrosion and blinding are major factors, but its initial cost is high. As wire hardness and tensile strength increases, so does the ability of the wire to transmit vibration and to prevent blinding.

A final opening of ⅜ in. or less is recommended, but the need should dictate the type of opening. A square opening is most efficient but it is limited in capacity. With slotted openings, plugging is usually sharply reduced; and the size of the opening should be reduced 10 to 12 percent to make the same sizes. Experimentation is necessary to find the best slot length. The most favorable length can result in as much as 40 percent more production and 15 to 20 percent longer screen life. Keeping screencloth tension tight is important in keeping efficiency up and breakage down.

Explosives A new type of explosive which apparently will fit in between dynamites and ammonium nitrate was described by Doak Conn, a technical representative of E. I. du Pont de Nemours & Co. This explosive is a non-capsensitive, water-compatible explosive slurry which is not as cheap as ammonium nitrate but which is designed to replace it if water is present or if more weight and power is required.

Sales Session At the Sales Session the highly effective sales promotional activities of Dolomite Products, Inc., Ocala, Fla., were described by Fred Y. Montsdeoca, sales manager. This company now has five plants and sells primarily to large and small orange groves. Many groups of groves totalling up to 7,000 acres are supervised by one caretaker, and many have their own spreaders. Eight full-time salesmen are employed, and all prospects are called on at least 3 or 4 times a year. Direct mail advertising is also used, and the company also exhibits at agricultural fairs. Dolomite Products has its own laboratory, and has tested up to 30,000 soil samples annually. Agstone delivered and spread costs $6.50 to $7.50 per ton, averaging $1.75 freight, $3.00 spreading charge, and $2.25 up at the plant.

Due to illness, Clint A. Allen, executive secretary of the Iowa Limestone Producers' Association, was unable to be present. His place on the panel was taken by Arthur R. Alvis, who is a great believer in give-aways. A gift is sent each Christmas to each customer who makes the 100-Ton Club, and the custom pays! This year the gifts were plastic litter bags for cars.

Small Business The *Future of Small Business: SBA Services* was the title of a talk given by Philip McCallum, administrator of the Small Business Administration. We are in the jet age, he said, and it is becoming even more important for the small businessman to keep up with (or ahead of) the rapid changes. SBA is set up to help in several ways, including financial assistance in various forms.

An example was a 15-year old small crushed stone-agstone operation owned by two brothers. They found that $53,000 was needed for equipment to provide better operation and more capacity. The local banker had already loaned them as much as he could justify; he therefore suggested co-operation with SBA. The business was found to be sound and well-managed; so $55,000 was loaned, plus $32,000 to pay off existing debts, all on a 7-year basis at 5 percent interest, with the bank participating. The company expanded, hired 15 more men, and is prospering. SBA, said Mr. McCallum, also helps privately-owned small business investment companies, makes disaster loans, and helps firms to get government contracts and subcontracts.

Reducing Effects of Fallout *Reducing the Effects of Radioactive Fallout on Agriculture in Time of Emergency* was the timely subject of Dr. Frank A. Todd, assistant to the administrator for Emergency programs, Agricultural Research Service, U.S.D.A. This organization is responsible for agricultural research relationships to national defense, including the safety of crops, livestock, and the farmer and his family. Much has been accomplished along these lines, Dr. Todd conceded, but there is much yet to be learned.

An atomic explosion results in the release of about 100 different isotopes, each with a different life. Strontium 90 is one of the longest lived and is by far the greatest menace, as it is most readily taken up by plants. Underground shelters are the best protection; next come brick and stone structures. Wooden buildings offer little protection but are better than nothing. At least 48 hours of protection is necessary

The best form of decontamination is burial. Any contaminated shallow root crops should be cut and removed or plowed under 2 to 3 ft. deep. Then liming and seeding results in safe succeeding crops. The application of lime to an acid soil lessens the uptake of Sr_{90} by a factor of three, and alkaline soils have a very low uptake. Animals absorb fallout through their skins and food, and also inhale it.

Many angles of the problem are being worked on, said Dr. Todd, and field tests to be made this summer promise interesting results. By combining all factors of protection and decontamination, he feels that much of the danger can be overcome.

Transportation Policy In a paper entitled *Our National Transportation Policy* John J. Allen Jr., under-secretary of commerce for transportation, said that transportation has prob-

lems similar to those of a producer industry; it must be able to meet the needs of customers, keep up with new developments, improve its service and economy of operation, etc. But, as a broad public service, it is subject to government regulation and promotion. The Transportation Act of 1920 and the later Act of 1940 are no longer representative of actual conditions and are badly in need of revision. The entire transportation policy is now under study, and a report will be available soon.

Transportation should be a competitive field, according to Mr. Allen; therefore, it should be allowed to expand or contract as necessary. Industry must have free economic choice of type of transportation for its practical and proper future development, and everyone benefitting from publicly provided facilities should help pay for them.

Geology *Geologic Features of Limestone Quarries* were described and illustrated by James A. Humphreville, consulting geologist of Lancaster, Pa., who pointed out that limestone deposits are bedded, and that many operators who move out of an area when they have trouble could continue to operate by quarrying these beds selectively.

Most important limestone deposits were formed by small oceans and seas mainly from organic sources, but also from deposition from the water of other minerals besides calcium carbonate. As a result, each bed has a different analysis and character, which is a problem except in very thick beds. Producers must know their bedding and where it goes, so that the type and direction of development can be selected. Badly folded and broken deposits offer particularly serious problems.

Tax Matters *Tax Developments of Interest to the Limestone Industry* were outlined by John T. Sapienza of Covington & Burling, N.L.I. counsel. The President's budget message asks for the elimination of "excessive" depletion allowances for cement, clay, etc., and it is believed that either the Supreme Court will render a decision or it will ask Congress to take action. Mr. Sapienza believes that grinding may stay, but that bagging and other final steps will go sooner or later. In none of the recent cases was the Treasury Department's least processed product contention upheld, but there is a possibility that these decisions may be reversed on that basis.

The general depreciation of equipment is receiving much attention; and there is a drive on employee expense accounts. If a company pays all of an employee's expenses, only the company needs to present details. For 1960, employers will be asked to show all expenditures paid for or by employees, partly as a guide to employees whose accounts should be checked.

Labor Law In discussing *Some Aspects of the Amended Taft-Hartley Act,* Stuart Rothman, general counsel of the National Labor Relations Board, confined himself to a very elaborate discussion of the part the building and construction industry plays in the new labor law. This act provides for the reporting and disclosure of union affairs, finances, etc., and restricts some practices; it is a very comprehensive subject.

Special Features The annual reception and banquet were as usual highlights of the meeting and were well attended by the members, senators, congressmen and other invited guests. Co-Chairmen W. L. Bryan and Thomas E. Lalley presided. The banquet speaker was Allen J. Ellender, senior senator from Louisiana and chairman of the Senate Committee on Agriculture.

Another feature of the convention which is always popular was the Manufacturers' Division's Guest Night, at which the producers and their wives were the guests of contributing manufacturers.

At the Thursday luncheon an interesting and thought-provoking talk was given by Robert M. Bridges (Consumers Co. Division, Vulcan Materials Company), a regional vice-president of N.L.I.

As usual there was an interesting program for the ladies under the joint chairmanship of Mrs. W. L. Bryan and Mrs. Thomas E. Lalley. This included teas, luncheons, sightseeing, etc.

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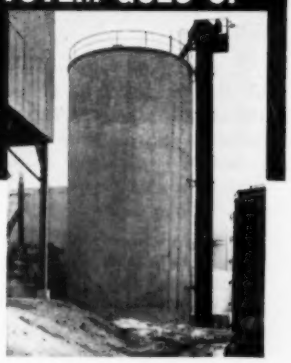

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A Basic Rotary Kiln Design for Lightweight Aggregate

About the Author . . .

M. F. Parsons, author of this article, is well qualified by training and experience to write on this subject. A graduate in ceramic engineering from the University of Saskatchewan in Canada, he has had practical experience which includes 12 years of actual operating experience in lime, stone, and similar industrial mineral operations in Ontario, Quebec, and Alberta, and also in various parts of the United States.

In 1959 Mr. Parsons joined the International Lime & Stone Corporation of Chazy, N.Y., and its associated company, Dominion Lime Ltd., of St. Bruno, Que., to open a consulting engineering service. This service includes complete engineering and design of industrial mineral processing plants, and the design of both vertical shaft and rotary kiln calcining equipment of high thermal efficiency.—The Editors

Fig. 1—Chart of principal types of clay.

Classification	Transportation	Color fired	Refractoriness	Original hardness	Common Name
Primary or residual	None	Light	Medium or low	Rotten rock	1. Semikaolinized feldspar or granites; Cornish stone and Jap stone
		White	High	Soft	2. Residual kaolins; when washed produces china clay
		Dark	Low	Soft	3. Residual basaltic clays, etc.
		Dark	Low	Soft	4. Aeolian primary clays, weathered volcanic ash
Secondary or transported	Water	White	High	Soft	5. Secondary kaolins (see Primary kaolins)
		White	High	Soft	6. Ball Clays
		Buff	High	Hard	7. Flint Fire Clays
		Buff	High	Soft	8. Bond Clays
		Buff	High	Soft	9. Common fire clays
		Buff	High	Soft	10. Aluminous allied minerals
		Buff	Medium and low	Soft	11. Poor refractory clays, terra cotta, stoneware, etc.
		Dark	Low	Hard	12. Siliceous shales Calcareous shales Ferruginous shales Carbonaceous shales
		Dark	Low	Soft	13. Bedded clays
		Dark	Low	Soft	14. Alluvial clays
	Wind	Dark	Low	Soft	15. Weathered loess
	Ice	Dark	Low	Soft	16. Glacial lake clays (sorted by water)
	Ice	Dark	Low	Soft	17. Weathered glacial till

THE lightweight aggregate industry is truly an "expanding" one. Its volume of production has increased 550 percent in the last ten years, and many operators feel that they have just broken the surface of the sales of this comparatively new construction material.

The tremendous increase in the use of this material is the result of a hard-fought battle in sales and promotion. The main problem has been to overcome the technical difficulties in the use of the product and to educate the architect and engineer to its many advantages.

Possibly because of the amount of effort spent in promoting the product, the actual technique of its manufacture has not kept pace with the expansion of the industry; and it is possible that some of the keys to even greater expansion are being missed.

Two of the main factors likely to govern the rate of industry growth are: (a) that most expansion will be in sites where no plants are presently in operation, and the cost of new plants is high; (b) that the cost of the aggregate itself is high, compared to natural aggregates, and the margin of profit is small.

We believe that this industry will naturally follow the trend of the cement and lime industries toward large-volume, higher-efficiency plants, which can be profitably operated where smaller plants can not. It is our intention to show how a basic manufacturing technology could help accomplish the expansion and help reduce the importance of the two factors mentioned above.

At this time we are considering only the expansion of clay and shale in rotary kilns to produce high-strength lightweight aggregate, since

By M. F. PARSONS

this particular method appears to be the most successful.

Strangely enough, many of the plants which have been built during the last few years to accommodate the industry's expansion do not indicate a trend toward improvement in efficiency. The only definite characteristic that can be ascribed to the industry is that "everybody's methods are different." A survey of operations will reveal long kilns with low inclination and short kilns with high inclination, and also large kilns making comparatively small amounts of aggregate and small kilns making fairly large amounts of aggregate. Most unusual is the fact that some of the oldest and smallest plants are the most efficient.

These wide variations in operations throughout the industry have fostered the attitude that "what applies to one plant doesn't apply to another," and many operators are content to continue in their present methods, believing that if somebody is getting better results, it is only because of differences in the other's raw material.

Actually, it can be shown that most of the shales and clays used in these processes are basically similar, that the general rules of heat application apply to all cases, and that all plants can actually be measured by the same yardstick.

In the following discussion the burning of clay and shale will be occasionally related to the calcining of limestone because limestones are fairly uniform and definite in chemical analysis, and the science of their decomposition is comparatively well established.

Characteristics Of Clays, Shales First, an examination of the basic characteristics of clays and shales and the bloating process is in order.

Clays and shale show extremely wide variation in chemical composition and physical characteristics. Generally it can be said that clays are the weathered product of silicate rocks which have been transported, classified, and deposited as sediments, which, in turn, have been metamorphosed to varying degrees by heat or pressure to form shales.

Wilson, in *Ceramics, Clay Technology*, has given us a condensed chart listing 17 principal types of clay, shown in Figure 1.

The phenomenon of bloating in clay was a thorn in the side of brick manufacturers long before it was put to use for the manufacture of lightweight aggregate. Unless special care was taken in the firing, whole kilns of brick could be ruined by bloating.

The bloating is caused by the entrapment of gases by the sealing of the surface pore structure, as the clay is brought to the vitrification point.

Figure 2, also from Wilson, shows the approximate removal of various volatiles from the clay body as the temperature is raised. The two curves which are most significant here are those of carbon and the CO_2 from the decomposition of calcium carbonate as both of these are present in considerable quantities at temperatures close to the vitrification point.

It can be readily shown with these curves that to be satisfactory for manufacture of aggregate, the clay or shale must have a vitrification temperature between 1,800 deg. and 2,000 deg. in order that the gaseous components will not have been completely driven off before vitrification takes place. It can also be shown that almost all the volatiles could be removed before the vitrification temperature is reached, if the temperature were raised slowly enough.

Therefore, it follows that one of the requirements for bloating is that the temperature of the clay or shale be raised rapidly, particularly in the late stages of firing, in order to reach the surface vitrification temperature before the gases are completely removed from the core. Actually, fairly small amounts of volatiles can be sufficient to cause the bloating required for lightweight aggregate manufacture, if the process is controlled in a satisfactory manner. This is borne out by the fact that some clays used for aggregate are also used successfully for brick manufacture.

From the discussion above, it is obvious that bloating shale or clay has been defined within fairly close limits. For bloating, the material must have a fairly low vitrification point, and it must contain some carbon or some carbonates, or both. We have also established one of the design requirements of the kiln—provision for a rapid rise of temperature in the last stages of the firing.

Returning to the tabulation of the principal types of clays, we find that we are restricted almost entirely to Types 12 and 13. Types 14 and 15 are not likely to be physically suitable, and Type 16 is very low in carbon. A few clays in use may fall into the class of Type 3 or 4.

Heat Requirements The next step is to examine the actual heat required to treat or fire the clay. Compared to the manufacture of lime or portland cement, involving large quantities of heat for dissociation of calcium carbonate, the firing of clay requires very little heat. In the heating of a pure clay, such as a kaolin or china clay, the only endothermic reaction is the dehydration of $Al_2O_3 2SiO_2 . 2H_2O$ which takes place in the region of 1,000 to 1,100 deg. F. The quantity of heat required is minor and can be considered to be nearly balanced by the exothermic dissociation of the $Al_2O_3 2SiO_2$ occuring in the vitrification range of the average shale.

In a shale or clay, therefore, the main endothermic reactions are going to be the decomposition of the impurities such as calcium and magnesium carbonates. These, in turn, may be partially balanced by the fuel value of the carbon and the sulphur present as pyrites. The following is an analysis of a typical shale:

SiO_2	—	54 %
Al_2O_3	—	16 %
Fe_2O_3	—	6.5%
CaO	—	4 %
MgO	—	3 %
K_2O-Na_2O	—	3 %
TiO_2	—	1 %
Ignition Loss	—	12.5%
Total		100%

Chemically combined moisture 4.5% (part of ignition loss)

In firing this shale to bloating temperature and complete cooling, the actual heat absorbed (assuming all the CaO and MgO present as carbonates) would be as follows:

$\frac{4}{100} \times 1{,}378$ B.t.u.'s = 55.1 B.t.u.'s per lb.

$\frac{3}{100} \times 1{,}220$ B.t.u.'s = 36.6 B.t.u.'s per lb.

Total 91.7 B.t.u.'s per lb.

This would indicate a theoretical heat requirement of 183,500 B.t.u.'s per ton of shale fired, or about 210,000 B.t.u.'s per ton of aggregate. On a 60 lb. per cu. ft. aggregate, this would be about 170,000 B.t.u.'s per yd. of aggregate.

Against this theoretical figure, the lowest heat requirement the writer has encountered in practice, is 2,000,000 B.t.u.'s per yd.; and many plants are operating in the range of 3 to 4,000,000 B.t.u.'s per yd. Total efficiency of the process appears to be at best about 8 to 9 percent. Admittedly, the rotary kiln is a poor heat exchange apparatus, but certainly not that poor.

Heat Balance Using the Shale Analysis

Heat balance, basis 1 cu. yd. of aggregate
= 1,620 lb. of aggregate
= 1,850 lb. of shale feed

Fuel 2,000 cu. ft. of natural gas @ 1,000 B.t.u.'s per cu. ft.

		Percent of total
Heat of dissociation of carbonates 1850x91.7 B.t.u.'s	170,000 B.t.u.'s	8.50
Latent heat of chemically combined moisture $\frac{4.5}{100}$ x1,850x1,000 B.t.u.'s	85,000 B.t.u.'s	4.25
Latent heat of moisture from gas combustion	200,000 B.t.u.'s	10.00
Loss in aggregate at 1,750 deg. F.	650,000 B.t.u.'s	32.50
Radiation and miscellaneous	335,000 B.t.u.'s	16.75
Heat in products of combustion at 1,000 deg. F.	560,000 B.t.u.'s	28.00
Total	2,000,000 B.t.u.'s	100

Calcining Of Lime The rotary-kiln calcining of high-calcium lime should also be examined. We know that good lime kilns with coolers can burn lime with about 7 million B.t.u.'s per ton of product. (In this case we will consider only kilns without external preheaters, because preheaters are not readily applicable to the lightweight aggregate process.) The theoretical heat of dissociation of calcium carbonate is 1,378 B.t.u.'s per lb. of oxide formed or 2,756,000 B.t.u.'s per ton.

Total efficiency in the kiln mentioned above is $\frac{2{,}756{,}000}{7{,}000{,}000} = 39.3$ percent. Even a poor lime kiln is better than 30 percent efficient—or more than three times as efficient as the aggregate installations. The lime kiln labors under the extra burden of being able to use only high-level heat in its dissociation process, and it also has an increased weight of exhaust products to carry away heat.

To find out where all this wasted heat energy is going, a rough heat balance can be run on a hypothetical lightweight aggregate kiln—e.g., a very good operation with a 2-million B.t.u.'s per yd. heat requirement with a kiln specific capacity of 10 cu. ft. of kiln volume per cu. yd. per 24 hours. The kiln may be given a 10-to-1 length-to-diameter ratio, which is quite commonly found in the industry.

Using the shale analysis mentioned above, the heat balance shown at the top of this page is obtained.

Points of Heat Loss As previously mentioned, this is a hypothetical set of figures, based on observed conditions on several plants, but it is a better-than-average performance. The serious points of loss are immediately apparent. They are: (1) the heat in the products of combustion which is discharged up the stack, and (2) the heat lost in the aggregate when it is dropped red hot into the pit. The radiation loss is also surprisingly high, considering the fact that the kilns are actually of fairly low temperature for most of their length.

The sensible heat thrown away in the open pits of most lightweight aggregate plants is 50 to 70 percent recoverable in rotary coolers. This one improvement would appear to reduce the heat requirements by 20 percent.

Strangely enough, some of the plants using coolers are not even close to the 2,000,000 B.t.u.'s per cu. yd. hypothetical kiln described above. As an example, a certain plant using rotary coolers, has a heat requirement of about 3.5 million B.t.u.'s per cu. yd. A part of the reason for this low efficiency is that this kiln is operated at a specific capacity of 38.5 cu. ft. per yd. per 24 hr. (as against 10 cu. ft. for the "good" kiln we are considering), and it has 3,150 sq. ft. of surface for loss of heat by radiation as against 1,100 for the same production in the "good" kiln. The radiation loss could be expected to be nearly twice as high as in the more efficient kiln, which would account for the heat recovered in the cooler. The additional loss in this particular case is due to excess air combustion conditions, giving a high stack loss.

The difference in the two kilns mentioned above is typical of the aforementioned wide variations in operation found throughout the industry.

Thus two requirements of the efficient lightweight aggregate kiln have been established: (1) it should have a cooler or some means of recovering the heat from the aggregate; (2) it should be fairly small for the amount of aggregate produced in order to reduce the area of radiation surface.

Heat Recovery However, there is still 30 percent or more of the heat going up the stack. This is particularly regrettable

because *all* of this heat is usable in the clay or shale operation.

In the lime kiln there is some excuse for high exhaust temperatures because after the fairly inefficient calcining process, there is more heat left over than is needed to preheat the stone. In the shale operation every B.t.u. recovered in the preheating section represents one less that will have to be added at the firing end.

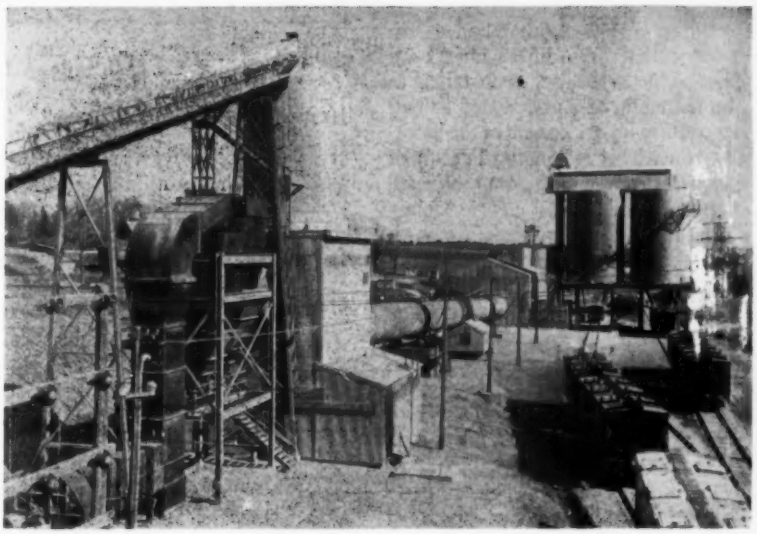
The question is "How can this heat be recovered?" The kiln cannot be lengthened because it must be kept fairly small. Its length-to-diameter ratio cannot be increased too much because a long kiln has more radiation surface per cu. ft. than a shorter one. Also, there is a practical limit to the amount of material which can be moved through a small-diameter tube.

One generally recognized principle in the industry is that the load or depth of bed under the fire must be fairly light. This is in agreement with the design principle mentioned earlier that there must be a sharp rise in temperature in the last stages of firing. Small-diameter kilns for high tonnages mean high percent load factors, which are going to be difficult to control under the fire.

Increasing Preheater Efficiency

The problem, then, is really one of increasing the effectiveness of the preheating portion of the kiln, which in this case actually refers to 50 to 60 percent of the kiln length. To increase the effectiveness, the heat transfer area and the retention time must be increased. This can be accomplished with dams, lifters, or quadration. It is a natural application for quadrants, especially the cast-metal types, because the temperatures are generally low and the cheaper alloys can be used.

The tendency of quadrants to retard the flow of material through the kiln is well known in the lime industry. In some cases it has been proved that straight quadrant sections will have a retention factor as high as 2.5. That is, the retention time will be 2.5 times as long in a given length of kiln with quadrants as in the same kiln section without quadrants. This means also 2.5 times the percentage load in the kiln. Both these conditions fit the given requirements perfectly.



A modern rotary kiln lime plant.

The first design requirements of a light load in a small kiln have dictated a fairly large diameter at high inclination and high rotative speed. It is this very set of conditions which has caused the high exhaust temperatures; but this same set of conditions allows heavy quadration and damming in the back portion of the kiln, without danger of overloading or backspill.

So it is possible to have load levels of 15 to 18 percent in the preheating section, and still have the fast-flowing, thin bed in the bloating zone.

Extension of this idea could even indicate a two-diameter kiln. The smaller section, heavily quadranted, is operating at a heavy load, discharging into the larger diameter section, where the rate of travel and reduction in load could be increased to an even greater degree.

This type of operation would not only reduce the temperature of the exhaust gases; but because the preheating would be more effective, it would reduce the tendency to operate with considerable excess air in an effort to "push" the heat to the back of the kiln, a practice which causes even higher than normal stack losses. The writer has noticed this method of firing in several plants; it is probably necessary, with the kilns installed as they are.

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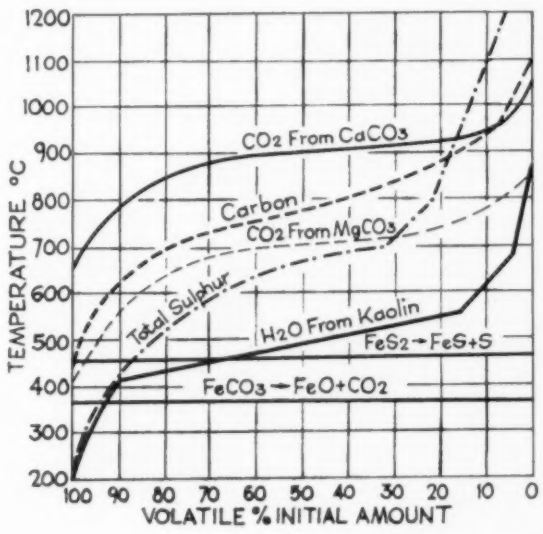


Fig. 2—Approximate removal of various volatiles accompanying temperature rise.

Lifters afford another benefit. In a few cases where lifters have been tried, a decrease has been noted in the tendency of some shales to ball up or form large clinkers in the bloating zone. This is a natural result of more thorough preheating of each particle, which reduces the differential temperature between the interior and the surface of the particle at the bloating temperature.

Just how much we are going to be able to reduce exhaust temperatures by this procedure is difficult to estimate. However, it should be considerable because the effect is cumulative. Every increase in heat recovered will reduce the amount of fuel fired, which means an increase in ratio of feed to exhaust gases. An exhaust temperature of 500 deg. F. is a reasonable figure to aim at.

Changes in Heat Balance Adding these improvements to the hypothetical kiln shows how the heat balance picture is changed. (See the table at the top of this page.)

Changes in Heat Balance

		Percent of total
Heat of dissociation	170,000 B.t.u.'s	15.75
Latent heat of combined moisture	85,000 B.t.u.'s	7.90
Latent heat of moisture or combustion	108,000 B.t.u.'s	10.00
Loss in aggregate and radiation from cooler	260,000 B.t.u.'s	24.10
Radiation from kiln	335,000 B.t.u.'s	31.00
Heat in products of combustion at 500 deg. F.	122,000 B.t.u.'s	11.25
Total	1,080,000 B.t.u.'s	100

Actual heat of dissociation of impurities and that latent in the combined moisture is unchanged. The addition of a rotary cooler which is recovering 60 percent of the heat in the aggregate is assumed. Radiation loss from the kiln in B.t.u.'s can be expected to remain about the same, but the percentage of loss is much higher because the amount of fuel is greatly reduced. The heat loss up the stack is only 22 percent of that in the original kiln, due, again, to the reduction of fuel, as well as to the actual reduction in temperature of the exhaust gases.

This kiln would make aggregate with a fuel requirement of only 1,100,000 B.t.u.'s per cu. yd. (which I would venture to say is far less than 50 percent of the average used in the industry to-day); but it still has a heat efficiency of less than 16 percent.

There is nothing in this "hypothetical" kiln operation which could not be put into practical use in the industry immediately. The practical proofs are evident throughout the industry. Kilns operating at a specific capacity of 10 (or less) cu. ft. per cu. yd. per 24 hours, are in existence. Coolers are in use, and quadrants are in use in the lime industry. All that is necessary is to apply all these factors at once. But we must apply all of them because it is the nature of the rotary kiln process that heat recovered at one point is very likely to show up as an increased loss at another point in the system.

As mentioned previously, some of the older operations using small equipment show the best fuel efficiency, probably because the demand for material has necessitated the development of peak production in this equipment. In some cases, little can be done to improve on these operations without more expenditure than would be justified.

Avoid installing new, larger, more expensive plants based on existing operations which are themselves inefficient. The new installations could result in even lower efficiency in the scaled-up plant.

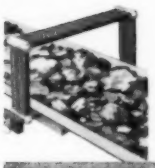
Summary (1) The kiln should be equipped with a cooler to recover the heat from the aggregate. (2) The kiln must be small in relation to its production, because radiation is one of the major points of heat loss. The specific production of 10 cu. ft. is only the starting point, with figures of 8 or 7 in view. (3) Because of (2) the kiln will have to be operated at high inclination and fairly high speed. (4) It should incorporate internal preheaters such as quadrants; and dams to build high loads would be helpful. (5) Mechanical draft will be a necessity, because the volumes and static pressures to be encountered will be beyond anything but very large stacks.

The kiln outlined above would be only the first step in the right direction. There is every reason to believe that by the use of improved coolers, insulation, etc., this operation could eventually be carried down to the point where only 700,000 B.t.u.'s of heat is required. This concept should be applicable to any shale or clay which is presently being processed commercially with comparable results. It is true that certain shales will require more heat than others, but there is no excuse for plants operating at 3,500,000 B.t.u.'s per yd. when 2,000,000 is far too much.

The modern plant built on this principle would be of fairly low first cost because the kiln and cooler would be comparatively small. A typical 10- by 150-ft. kiln with a rotary cooler would produce over 1,000 cu. yd. per day. With a well mechanized crushing, screening, and handling system, the labor cost per yd., combined with the fuel cost of about 50 percent that is presently being experienced, the cost per yd. of the aggregate would be lowered to a competitive level.

Several new appointments have been announced by spokesmen of the Halliburton Oil Well Cementing Company, Duncan, Okla.

JOHN P. HARBIN is now vice-president, finance; J. E. THOMSEN, formerly chief accountant, succeeds Mr. Harbin as controller and assistant secretary. MARVIN K. BRUMMETT, formerly secretary, was named vice-president and secretary. W. D. OWSLEY, senior vice-president, was named a director.



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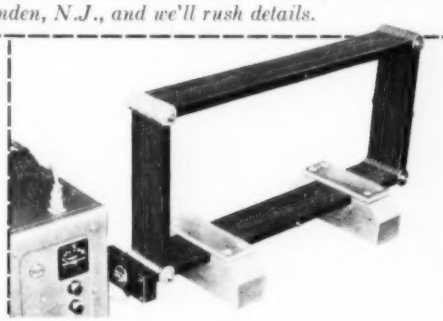

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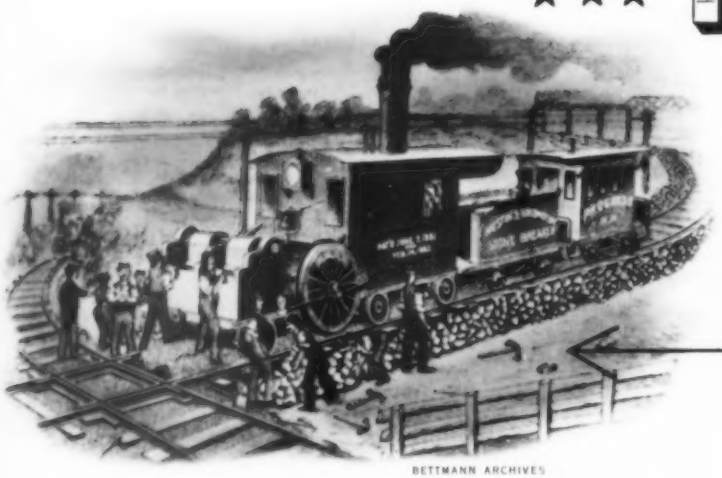

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Specialized Sand Plant Revolves for Stockpiling

Young New Jersey firm moves to second location; builds larger sand plant

By BUREN C. HEROD

ANOTHER ON THE SPOT report

SPECIALIZED production and a unique processing installation are two outstanding features of the Herbert Sand Company, Inc., at East Brunswick, N. J. Although it is a moderate tonnage operation, this installation reflects considerable ingenuity on the part of its owners, who have been in the industry for only the relatively short period of 11 years.

The East Brunswick plant, built about three years ago, serves two basic markets for which it produces primarily three grades of sand. A 150-t.p.h. facility, it was designed by Dan Herbert, one of two brothers heading the firm, and was built by the company crew. It replaces the company's original 100-t.p.h. plant at Milltown, built 11 years ago.

Depletion of the available deposit at that location, plus loss of part of the area to construction of the New Jersey Turnpike, caused the move to the present site. The latter is comprised of about 600 acres near the South River and at the edge of the famous Jersey marshes. The far-sighted planning of the Herberts has also made the unusable area of the tract pay off. This has been done through contracts with various communities in the vicinity which permit the latter to use such areas for dumping. As these section are filled, and then graded, they may be made available for commercial or other development.

The firm's basic markets, referred to previously, include ready-mixed concrete operations and mason contractors. For these purposes, concrete and mason sands constitute the major portion of production. Some asphalt sand is also produced, and a nominal amount of ¼-in. grits and pea gravel. The grits are sold primarily for use in guniting. Approximately 95 percent of the total output, however, consists of sand products.

Appropriately, the first unusual feature of the overall rather unusual operation appears in the type and method of plant feed. Dry or wet material may be delivered individually or simultaneously to the first processing phase, with supply *via* pan scraper or dredge. In normal production, only dry feed is delivered to the plant—the dredge being used mainly to enlarge a reservoir from which water is drawn for pump glands, sprays, slurry, etc. The enlarged reservoir can also be used as a source of water for future industrial growth.

In the dry pit, the material is excavated with a pair of 18-ton Euclid 29SH pan scrapers. An Allis-Chalmers H20 tractor is also operated in

The interesting and unusual design of the plant operated by the Herbert Sand Company, Inc., is evident in this overall view. All processing components of the main plant are installed on the rail-mounted structure, which can be swung through nearly a full circle.

the pit as an auxiliary unit to provide further traction in loading for the rubber-tired scrapers, as needed, and for windrowing or leveling scraper routes.

At the plant site the scrapers discharge their loads at the top of a ramp into either of two plant feed hoppers. The latter were incorporated into the design in order to provide as much consistency as possible in color and texture of the material entering the flow. Sand from certain sections of the pit differs in these characteristics from material in the remainder of the area, and the two types are separately dumped into appropriate hoppers.

These sands are then blended in desired proportions as they are drawn from the feed hoppers *via* Syntron feeders. The latter transfer the feed to a following 4- by 12-ft. triple-deck Cedarapids screen, also installed below the truck ramp in a screen and pump house.

When the dredge is utilized, the feed, at 10 to 15 percent solids, is pumped through an 8-in. line that discharges directly to the above screen. Power for the dredge pump is provided by twin GM diesels totalling 300 hp.

Separation of the raw feed is made with screencloth of ½-, ⅜-, and ¼-in. openings on the top, middle, and bottom decks, respectively. The upper deck removes debris; material retained on the middle and lower decks, respectively, are chuted to a rewash bin and to a 24-in. Eagle Iron Works single-screw washer.

A slurry of bottom-deck throughs and wash water is transferred *via* a Morris pump through a 6-in. line to the main plant. This slurry is maintained at 25 percent solids.

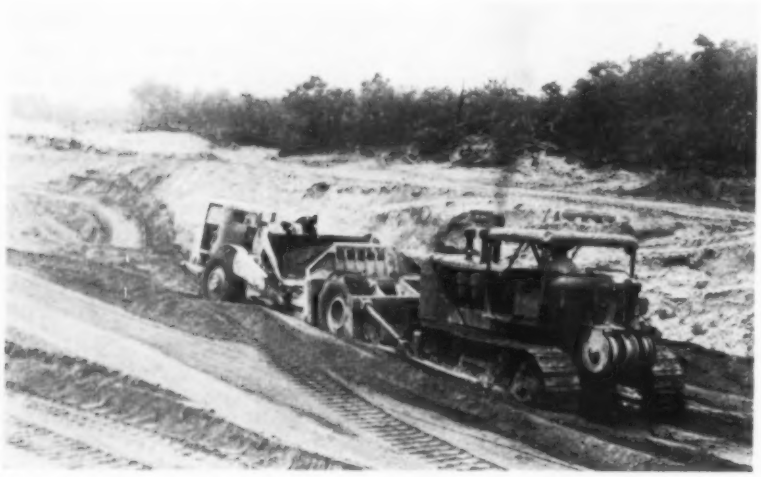
As shown in accompanying photographs, construction of the main plant was based on an unusual design. The entire facility, comprised of scalping tank, dewatering wheel, settling tub, and stacker conveyor, is mounted on a self-propelled pivoting framework. Traveling on a rail of 25-ft. radius, this structure is 85 ft. long from the pivot point to the head pulley of the stacker belt.

With the exception of a narrow space where travel is terminated on each side of an A-frame supporting the plant's feed line, the stockpiles of finished material nearly form a complete circle.

The feed line discharges into a box on the vertical axis of the pivot point, from which the slurry is flumed to a 20-ft. Eagle 5-valve scalping tank. Underflow from the valves of the latter is discharged into the adjacent 14-ft. square tub of a company-fabricated dewatering wheel.

This wheel, 6 ft. wide, and 14 ft. in diameter, discharges in turn onto the stacker conveyor. Fitted with a 30-in. wide V-ribbed belt, the stacker is supported on framework on a 25-degree incline, and is 72 ft. o.c. The ribbed belt has proven highly satisfactory in transporting the relatively wet products from the dewatering wheel.

With the moisture content as discharged from the stacker, the sand



Either dry or wet raw material may be fed to the plant. Dry pit operations are seen here.

A closeup of the main plant from the pivot point. Just above the latter is the 15-ft. settling tub. At top center is the 6- by 14-ft. dewatering wheel. The structure is 85 ft. overall from pivot point to stacker discharge.

piles have a 30-degree angle of repose. Different gradations of finished products are stacked on opposite sides of the main plant.

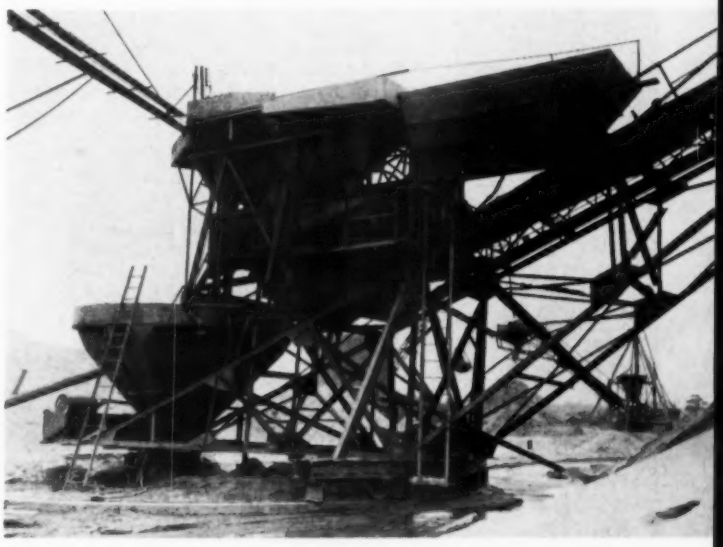
Overflow from the scalping tank and water overflowing the dewatering wheel tank are flumed to the 15-ft. diameter settling tub mounted just above the pivot point. Slurry is transferred from this tank by an Allen-Sherman-Hoff pump with 5-in. discharge to a separate installation in which asphalt sand is processed.

The latter operation is comprised of an Allen tank, also supported on a swiveling framework. It thus creates its own circular stockpile on a radius of 30 ft. One-half of this stockpile area accommodates asphalt sand production when there is an excess of fines from the main plant's production of concrete sand. The other half of the stockpile area is used to store concrete sand when the main plant is producing mason sand. In the latter instance, the coarser material is removed from the mason sand, as desired, and pumped to the Allen tank, as noted above, for dewatering prior to stockpiling.

Stockpiled material is rehandled into truck-loading bins by a clamshell crane. The firm operates a fleet of 10 trucks for delivery to customers within a radius of 30 miles.

Under the supervision of Dan and Harold Herbert, operations are handled by a 20-man crew, including drivers. The design for this interesting plant comprehended the ability to operate consistently at any variable production rate dictated by periods of either high or low demand.

Pan scrapers from the dry pit discharge into either of two hoppers, depending on the color and texture of the raw material from certain sections. When the dredge is utilized, the discharge flows directly to a screen housed below the truck ramp.



This view on the other side of the plant shows the 20-ft. scalping-classifying tank.

Dan Herbert, one of the two brothers heading this relatively young firm, designed the installation.

Also mounted on a pivoting framework, this cone processes sand for use in asphalt, and discharges onto its own circular stockpile.

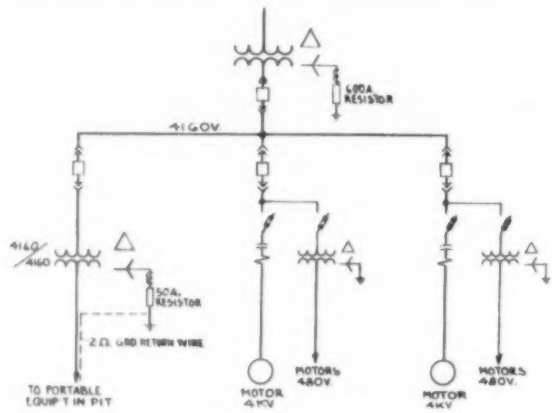


Fig. 1—Recommended neutral grounding scheme for quarrying operations.

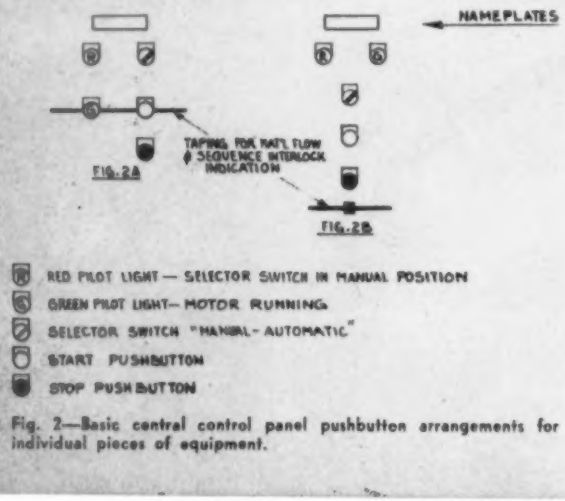


Fig. 2—Basic central control panel pushbutton arrangements for individual pieces of equipment.

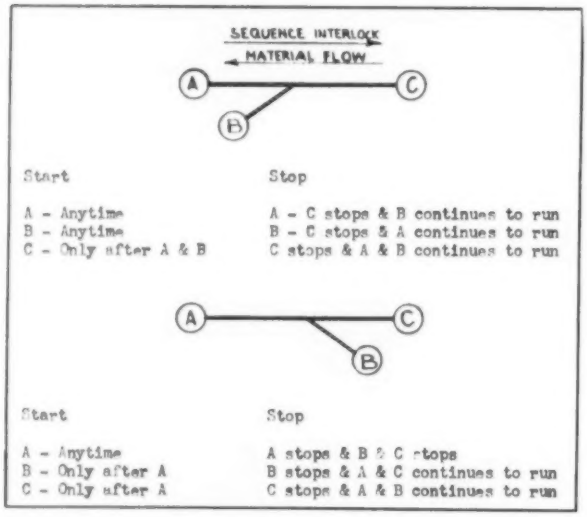


Fig. 3—Legend for sequence interlocking diagrams.

Lower

THE object of this paper is to review production-tested and proven basic applications of automation in quarrying and aggregate processing operations with the thought that to some degree it will be of interest and value to everyone —from those who may see a method for reducing costs by limited specific applications to those interested in the more comprehensive installations.

The purpose of automation in quarrying operations is to enable the owner to utilize his equipment and personnel to the maximum extent consistent with the design ratings of the properly applied equipment and efficient employment of the personnel—in short "cost reduction through automation."

Automation can be applied to economical advantage in practically all plants, regardless of their physical magnitude. It can be comprehensive and cover practically all phases of the operations, or it can be limited to individual specific problem areas.

The comprehensive application is generally limited to new installations, while the application to specific problem areas usually applies to existing facilities. However, this does not imply that existing facilities can not economically be converted to automatic operation. Every operating facility has its own peculiar and distinct problems which may be entirely different from a seemingly similar plant, and only a realistic factual appraisal of those problems by the owner can determine the desirability or feasibility of the application of automation. It is felt that many operators live with problems which they consider normal routine operating problems without giving more than a fleeting thought as to what could be done to eliminate the condition by a

Cost Aggregate Production Through AUTOMATION

By J. E. DOYEN
Principal Electrical Engineer
Western-Knapp Engineering Co.

■ **The object of this informative article* is to review basic production-tested applications of automation in quarrying and aggregate processing operations. Plant operators—from those striving to reduce costs by modifying an existing plant, to those planning an entirely new installation—will find this article a valuable background study of the subject.**

relatively simple and inexpensive application of a form of automation.

AUTOMATION PROVIDES MANY DESIRABLE FEATURES

The practical application of automation provides built-in protective features for all parts of the system. These features provide optimum safety to personnel and equipment, correct operating sequence of equipment, close control of components in specification mix products, maximum production by continuous maximum loading and minimum down time, and flexibility of operations for including optional equipment into process circuits to keep the plant in balanced and continuous operation.

Although these features will be obvious as we proceed, they are mentioned here to serve as a guide in noting the emphasis placed on these features in the detailed descriptions that follow.

The most economical solution to the scope of application of automation varies with each installation. Just as there is no hard-and-fast rule that can apply to over-all arrangement of plant facilities, there is no hard-and-fast rule that can apply to the degree of automation that is economical.

However, there are basic applications that can be seen in the modern facilities which could be considered necessities if they were understood by the owner contemplating a new installation. At least, with the knowledge of what is available and production-tested, the owner has the opportunity to consider the advantage or disadvantage of the use of such systems.

In the following presentation of the basic features of automation no attempt is made to describe the facilities of any one particular plant. The purpose for this is to cover a wider variety of applications and yet keep it basic.

In order to obtain the most efficient operation, the trend today is to divide the plant into several separate and temporarily independent operating divisions by the use of surge and storage piles or bins. This sectionalization permits a controlled continuous load on the equipment in the separate divisions, independent of the fluctuating loading at the pit and temporary shutdowns in other divisions.

Control of these divisions is from centralized control panels located at points where an operator is considered desirable for purposes of routine maintenance and human supervision of equipment. These stations are generally crushers and major screening operations. Depending on the operations, one man may have two or more centralized control panels under his direct operation.

A sand and gravel plant at Crystal Lake, Ill.,** is a good example of this type of operation. The operator in the screening tower controls the flow of material from the primary surge pile through the secondary crusher and screening operations into the sized product storage piles. He also controls the blending operations and loading into the load-out bins. In addition, he controls a rod mill and sand plant operations, including stacking with a radial stacker and loading from there into the load-out bins.

ELECTRICAL SYSTEM CORRESPONDS TO PLANT OPERATIONS

The basic electrical distribution system should be designed to correspond to the sectionalized plant operations. An electrical feeder serving one section or division of the plant should feed either *all or none* of the components of a different section.

The electrical power distribution system for the pit equipment should be isolated from the main plant system. A 50 ampere neutral grounding scheme is recommended for the pit circuits.

Figure 1 shows a distribution system and neutral grounding scheme that affords protection to system components and personnel, with sufficient advantages to justify the use of the isolating transformer for the pit circuit. The protective ground circuit for the pit should be designed for a maximum overall impedance of a value which will produce not more than a 100-volt drop for a solid ground fault, and the relaying scheme should be such that the ground-

*Reprinted from *Mining Congress Journal*, September, 1959.

**See *New Crystal Lake Plant for Consumers Co.*, July, 1956, p. 174.

faulted equipment is relayed off the circuit without disturbing the remainder of the system.

For those operators who do not desire to relay ground-faulted equipment off the circuit in the main plant immediately, the 600-ampere resistance shown in Figure 1 can be changed to a high resistance value. This system is being used today in refineries, where unscheduled shutdowns can be very costly.

In other words, there is a sacrifice of maximum protection for equipment for the ability to continue operating with one ground fault until a controlled shutdown can be made.

FOUR GENERAL SYSTEMS

In order to illustrate the features we want to present, we shall describe the following systems which are totally unrelated to any one particular plant.

1. A primary system, starting with the material being loaded and conveyed by portable feeders and conveyors from the quarry floor to the scalping screen and primary crusher located outside the pit, and then to a storage pile
2. A secondary and tertiary crushing system, starting with loading the bins ahead of the crushing and conveying to the screening plant
3. A screening plant and sized product bin storage
4. Blending of sized products and loading into load-out bins

In the automatic plant, the equipment is sequence-interlocked to prevent spillage of material and damage to equipment. Two types of sequence operations, permissive and automatic, will be noted in the descriptions that follow.

In permissive sequence operations the equipment is interlocked in such a manner that each piece of equipment is started individually but can be started only after the equipment which it loads onto has been started. After the equipment is running and any individual unit stops, everything loading onto this piece of equipment automatically stops, with this process continuing automatically back down the line to the beginning of the process.

In automatic sequence operations the equipment is interlocked in such a manner that with the start of one piece of equipment the unit feeding this equipment is automatically started with this process, continuing automatically back down the line to the start of the loading. If any piece of equipment stops, everything feeding that piece of equipment automatically stops.

To permit tests and also to keep the plant in operation if a fault develops in the interlocking system, a selector switch is provided for each piece of equipment. The selector switch can be set on the automatic position for normal operation with all the interlocking in the circuit, or it can be set on manual to by-pass the interlock system. It is recommended that a red pilot light be provided to show when the selector switch is set on manual.

Figure 2 shows a basic central control panel pushbutton and pilot light arrangement used for each individual piece of equipment. With the selector switch in automatic position, the local start-lockout stop pushbutton at the motor provides only a test start operation with the start button. The equipment will run only as long as the start button is held in the depressed position.

Figure 3 is the legend for the sequence diagrams that will be described.

These material flow and sequence lines are painted on the central control panels.

Primary System To describe the primary system mentioned previously we will begin with the sequence interlocking diagram, Figure 4 (A). All of this equipment is under the control of, and is operated from, a central control panel located at the primary crusher. Figure 4 (B) shows the control panel. With the selector switches on the central control panel in the automatic position, conveyor 7 is started first, the crusher is then started, the screen next, and then conveyor 4. With the start of conveyor 4, conveyors 3, 3A, 3B, etc., and feeder 2 start automatically, one after the other in the order from 3 to 2.

The portable conveyors are designed so that they may be used in any order without changing any wiring. Regardless of the order of use of any particular conveyor the interlocking and automatic operation will remain as required.

The controls for conveyor 4 are on the central control panel. Conveyors 3, 3A, etc., which are started automatically with the start of conveyor 4, have all their manual controls on each individual conveyor. Figure 4 (C) shows the electrical equipment on each of the portable conveyors. Each of the portable conveyors is wired in such a manner that the portable feeder may be plugged into receptacles on either end of the conveyor for feeding onto that particular conveyor and still maintain the automatic feature. Each portable conveyor, as also each conveyor mentioned in this paper, has an emergency stop switch operated from a $\frac{3}{16}$-in. stainless steel airplane wire strung from one end of the conveyor to the other on the walkway or normal maintenance side. A pull on this airplane wire will operate a maintained contact limit switch and stop the conveyor. The conveyor can not be started again until someone manually resets the limit switch.

Secondary and Tertiary Crushing System A secondary and tertiary crushing system made up of a battery of crushers is generally controlled from a central control station. The following is a brief description of a modern system with the layout so designed that the crushers can all be operated as secondary crushers, with the option to use a part of them as tertiary crushers by returning material from the screening plant.

The operator controlling the crushers also controls the scalping screens and bin loading operations ahead of the crushers, the crusher feeders, the crushers and their auxiliaries, and the single collector belt running beneath the crushers which feeds the belt conveyor to the screening plant. The surge bins ahead of the crushers are loaded by a tripper which shuttles back and forth above the bins.

When all the crushers are operated as secondary crushers, the shuttle is set by the central operator at the control panel to shuttle back and forth continuously above all the bins. Bin level indicators, located in positions to give high, medium, and low level indications at the central

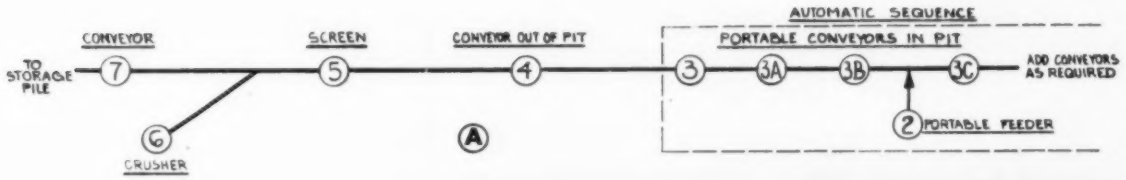
control panel, also give the signal to spot-load automatically any bin that gets low.

When part of the crushers are used as tertiary crushers, the operator sets the tripper controls to shuttle across only those bins feeding the secondary crushers, with the same automatic feature for spot-loading the low bin. The tertiary crusher bins are then loaded from the return belt from the screening plant. The central operator feeds the crushers by presetting a "Dynamic" feeder system to control the feed at a certain rate automatically controlled by the crusher loading, as determined from the current drawn by the crusher motor.

The controls are located on a platform level a few feet above the tops of the crushers. A central signal and auxiliary control panel contains the indicating lights for bin levels, tripper positions, lube oil flow alarms, lube oil high temperature alarms, tripper full chute alarm, audible alarm test and silencer pushbuttons, and the indicating lights showing the individual equipment in operation.

Bin Storage System The screening plant and sized product storage bins are under the control of a central control operator and panel in the screening plant located at a level to permit minimum walking distance for visual inspection of all the screens. Motorized flop gates are provided for diverting the flow of material from the sized product bins to conveyors carrying the product back to the crushing plant bins. The flop gates are controlled from the central control panel and can be operated without shutting down the operations.

The central control panel contains all the pushbuttons, selector switches, and indicating lights for equipment operation; the indicating lights for high, medium, and low bin level indications; and the flop gate position lights. Permissive sequence interlocking is provided. Blocking plates are



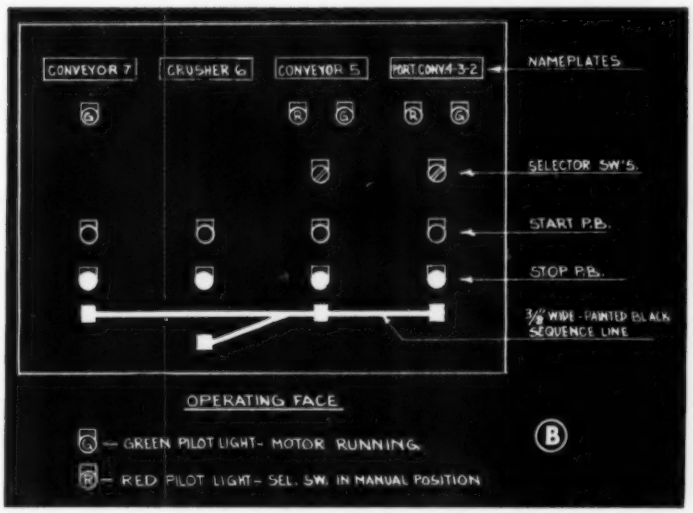
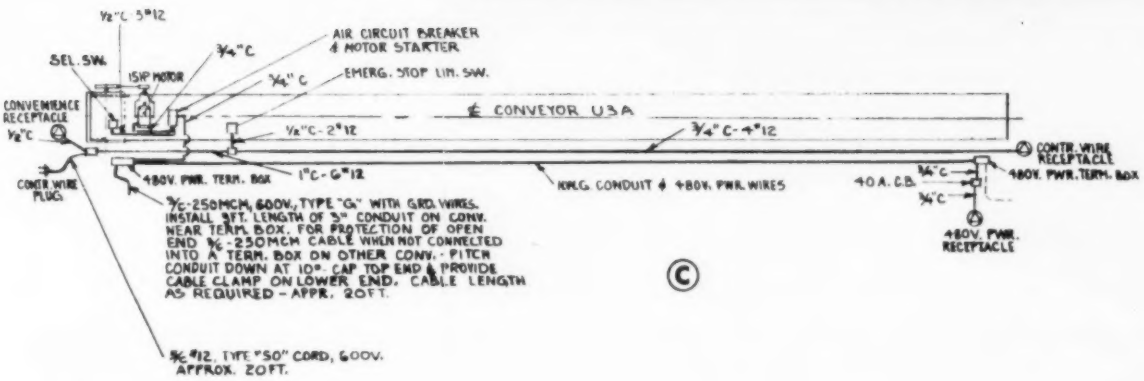


Fig. 4—(A) Sequence interlocking diagram of primary crusher and portable system from the pit.

(B) Central control panel for the primary crusher and portable conveyor system.

(C) Electrical equipment on the portable pit conveyors.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480V. PWR. TERM. BOX
CONTR. WIRE PLUG
1"C-6#12
KMLG. CONDUIT & 480V. PWR. WIRES
40 A. C.B.
¾"C
¾"C
480V. PWR. RECEPTACLE
3/C-250MCM, 600V., TYPE "G" WITH GRD. WIRES. INSTALL 9FT. LENGTH OF 3" CONDUIT ON CONV. NEAR TERM. BOX. FOR PROTECTION OF OPEN END 3/C-250MCM CABLE WHEN NOT CONNECTED INTO A TERM. BOX ON OTHER CONV. - PITCH CONDUIT DOWN AT 10°. CAP TOP END & PROVIDE CABLE CLAMP ON LOWER END. CABLE LENGTH AS REQUIRED - APPR. 20FT.
3/C #12, TYPE "SO" CORD, 600V. APPROX. 20FT.
C

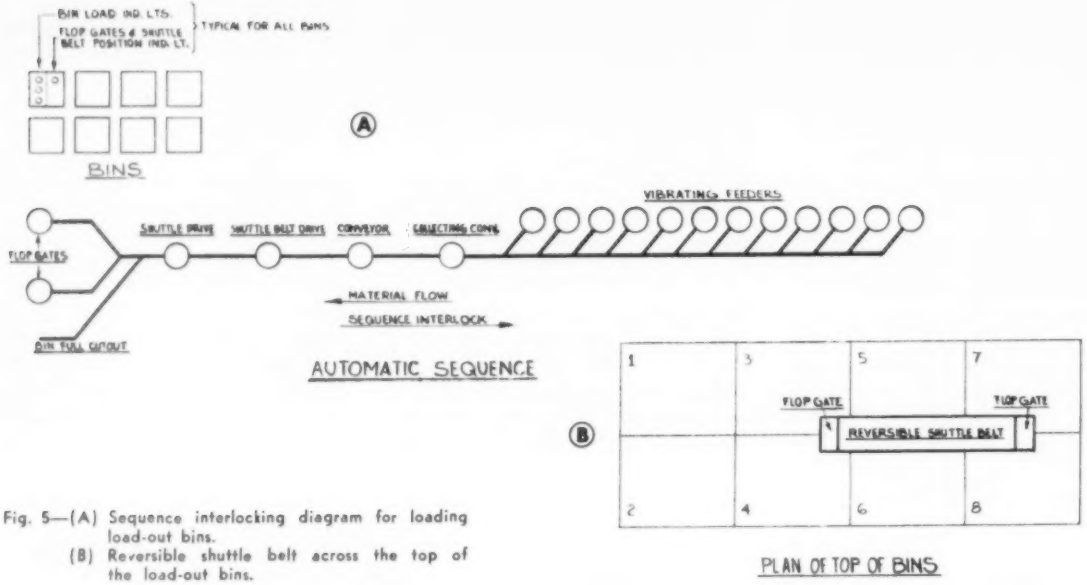


Fig. 5—(A) Sequence interlocking diagram for loading load-out bins.
(B) Reversible shuttle belt across the top of the load-out bins.

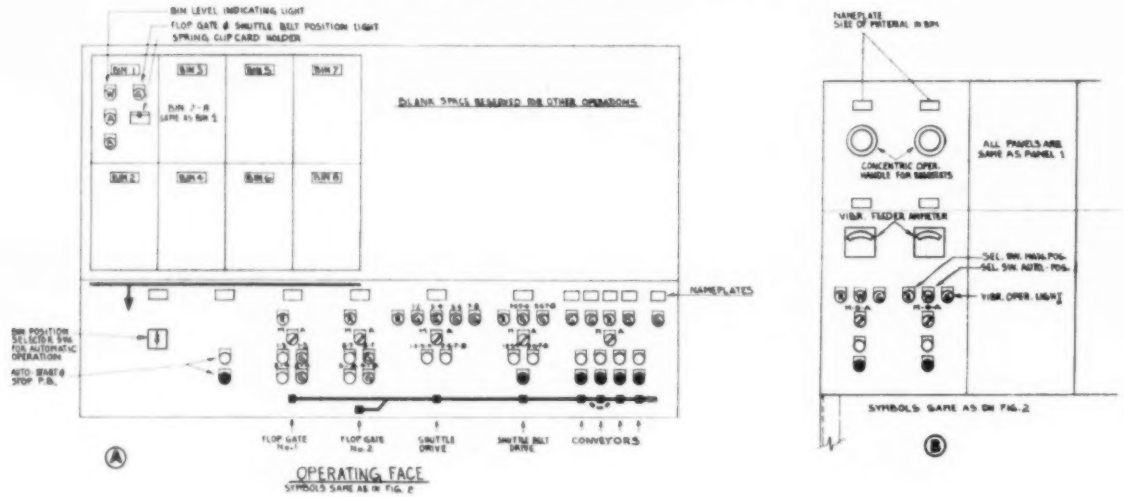
provided in certain chutes for the purpose of operating the plant at reduced capacity with a complete shutdown of a part of the screens. Limit switches are provided at the chute blocking points to provide automatically a complete equipment sequence interlocking system when the blocks are in place.

A full bin is noted by both a visible and audible signal, and a time delay is provided on high bin level signal before automatic shutting down of the operation. The time is sufficient to permit the operator to divert that particular size of product back to the crusher bins if he desires and thus avoid an automatic shutdown. This feature provides a means of keeping the plant in operation during a temporary unbalance of operations.

Major conveyor belts in this system, as in all the divisions are protected by centrifugal switches, chain-driven from sprockets on the tail pulley or adjacent bend pulley. The centrifugal switches provide protection for slack or broken belts and they also provide a positive sequence interlock scheme.

Blending and Loading System Depending on the capacity of the load-out system, blending of sized products and loading into load-out bins may be controlled by the central operator located at the screening plant, or by a central operator located at the top of the load-out bins. The fol-

Fig. 6—(A) Central control console for loading load-out bins.
(B) Vertical panel with vibrating feeder controls.



lowing description will cover a system under the control of the screening plant operator.

The sized product is blended onto a collecting conveyor by the use of vibrating feeders which are calibrated to deliver specified tonnages of material with different rheostat settings. An ammeter is provided in each rectifier circuit. The ammeters are used as a check against the rheostat settings for determining correct tonnage delivery.

A reversible shuttle belt with flop gates on each end is used for bin loading.

From the central control panel the operator selects the bin he desires to load into, sets his conveyors and feeders selector switches on automatic, pre-sets his individual feeder feed rates, and pushes his start button. The correct flop gate on the end of the shuttle belt positions itself, the shuttle belt positions itself at the same time, and upon reaching its correct position, will automatically start the belt in the correct direction. Each conveyor will automatically start in sequence back to the collector belt, which will then start the feeders in timed sequence. The control panel has high, low, and medium bin level indicating lights.

An emergency high level unit is provided on each bin to stop loading automatically, to prevent an accidental material overflow.

Figure 5 (A) shows the sequence interlocking diagram, and figure 5 (B) the reversible shuttle belt across the top of the load-out bins.

Figure 6 (A) and 6 (B) show the control console for bin loading and the vertical panel with the vibrating feeder controls.

Although only a brief comment was made in the earlier part of this paper regarding a sand plant, it is worth mentioning that the pumps in washing operations can be controlled by time delay devices to permit a temporary shutdown of pumps due to unbalanced water conditions without stopping the sand plant operations. These devices all contribute to a more continuous operation, prevent overflow cleanups, and protect equipment from damage.

New Crane Rating Standards Adopted by Mfrs. Association

A new and uniform method of rating full revolving power cranes was unanimously adopted at the December meeting of the Power Crane and Shovel Association.

Wilbur L. Schield, Schield Bantam Company, newly elected president of the association, stated that this action was taken to clarify confusion and to permit distributors, purchasers, and users of power cranes to compare machines on a uniform and equitable basis.

The standards committee of this association spent nearly two years on a study of this subject, and analyzed approaches to it.

Action will be taken by the association to have this method of rating cranes incorporated in the United States Department of Commerce *Commercial Standards CS90-85.*

FRED A. KOECHLEIN has been named general credit manager for International Minerals & Chemical Corporation.

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NEW HAMPSHIRE COMBINATION

- Sand and Gravel
- Ready Mixed Concrete
- Petroleum Products Haulage

KEEPS EMPLOYEES BUSY

By WALTER E. TRAUFFER

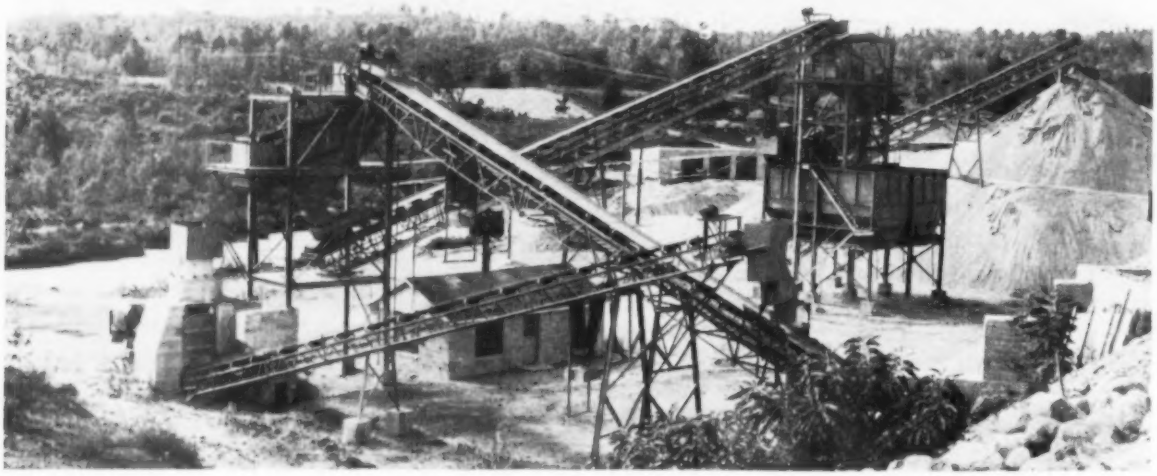
AN interesting combination of businesses is operated by J. Ludwin Proulx of Portsmouth, N. H., including oil, ready-mixed concrete, and sand and gravel. These services make it possible to keep the employees working the year round as most of the oil deliveries are made in the winter season, when sand and gravel plants are down and there is little demand for concrete. To some extent the equipment also is kept busy as the same truck chassis are used for truck-mixers and oil tanks.

Originally engaged in the oil hauling business under the name of the Prue Motor Transportation Company, Mr. Proulx bought the City Concrete Company of Portsmouth in 1946. All aggregates were purchased from a plant 55 miles away at a high cost due to the long haul. In 1953 Mr. Proulx formed the Dover Sand and Gravel Company and built an 80-t.p.h. plant and a ready-mix plant, near Dover, N. H., to supply all ready-mix needs. These plants are 12 miles northwest of Portsmouth.

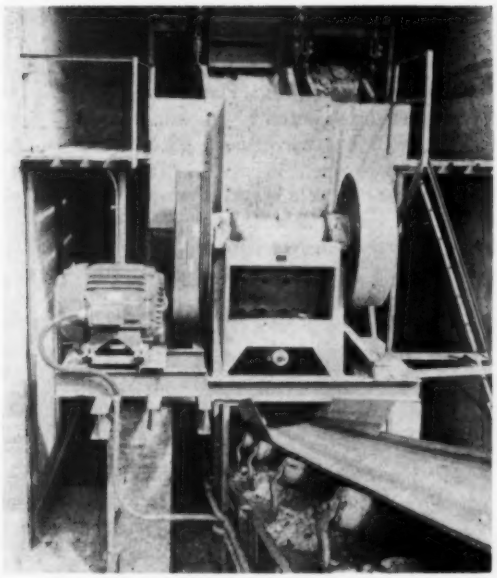
After a few years the demand increased so greatly—a fleet of 16 mixer-trucks up to 7-cu. yd. in volume is used—that more capacity was needed; in addition, the deposit ran low on gravel. A new deposit was located and tested which had ample coarse material, and in August, 1958, a 400-t.p.h. plant was in operation 4 miles northwest of Portsmouth on State Route 11 and only 2 miles from the Spaulding Turnpike (toll), which connects with the New Hampshire and Maine toll turnpikes at Portsmouth. This plant is operated as the Rochester Sand and Gravel Company.

The 26-mile haul to the company's yard in Portsmouth is made very quickly *via* the turnpike; and this highway is also a convenience

Plant of the Rochester Sand and Gravel Company. The primary crusher is at the right and the secondary crusher at the left, with the scalping screen above.



ALL YEAR



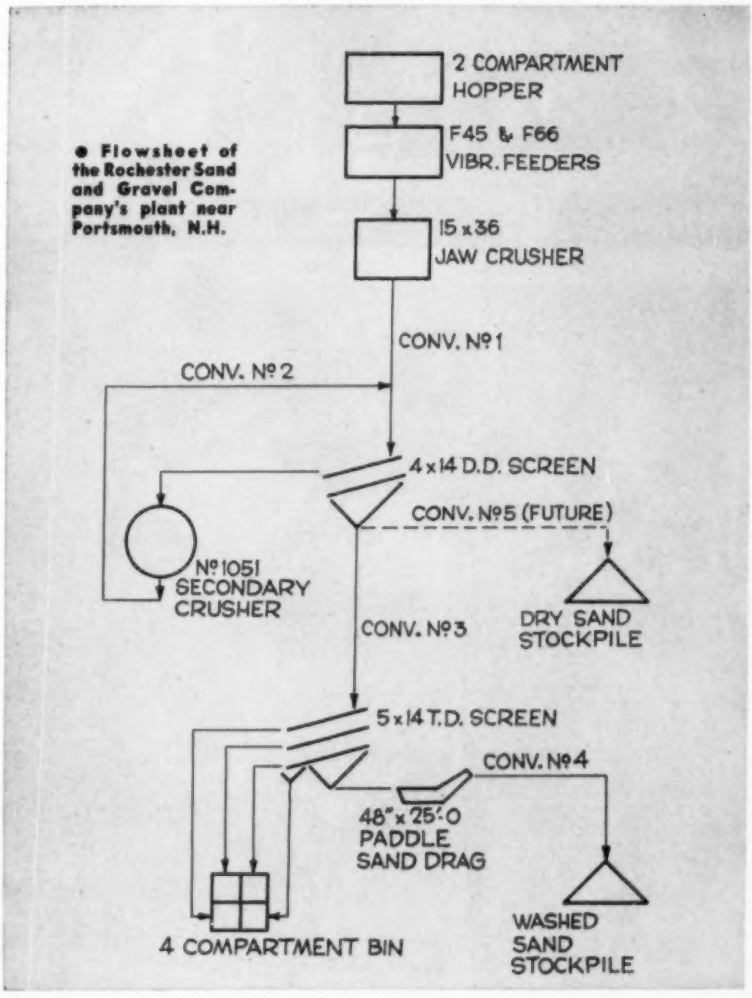
The 15- by 36-in. primary jaw crusher, with its two vibrating feeders, which can be used singly or together.

for the employees who work part of the time in Portsmouth and the other part at Dover and Rochester. The latter plant has actually produced its rated 400-t.p.h. capacity, but it is being operated at the rate of 200-t.p.h. now. The growing demand is expected eventually to require its full capacity. About 90 percent of the output is now being used by the two ready-mix plants.

The deposit at Rochester is glacial, with 60 percent minus 4-mesh and 40 percent gravel and also some boulders up to 12 and 16 in. There is very little overburden, which is removed by a bulldozer. The pit has a maximum face of 50 ft., well above ground water level. A Link-Belt Speeder No. 85 diesel shovel with ¾-cu. yd. dipper loads into two 10-wheel trucks—a Mack and a Brockway—which haul 15- and 10-ton loads about ¼ mile to the plant.

Material is dumped from the trucks over a 14-in. steel grating into a 200-ton divided steel hopper. One side is used when the material is running coarse, which is most of the time, and the other when it is running more sandy. Two Syntron vibrating feeders are used—a 36- by 72-in. F66DT on the coarse side and a 24- by 60-in. F45BDT on the fine side. Both feeders have 36-in. grizzly bar extensions with 2-in. spacing to bypass the fines around the primary crusher.

The oversize from either feeder-grizzly goes to the 15- by 36-in. Rogers Iron Works jaw crusher, which is set to reduce to 4 in. minus. It is equipped with SKF roller bearings and is driven by a 50-hp. motor. A 36-in. by 125-ft. belt conveyor



● **Flowsheet of the Rochester Sand and Gravel Company's plant near Portsmouth, N.H.**

(No. 1) carries all the material to a 4- by 14-ft. Allis Chalmers Ripl-Flo 2-deck dry scalping screen with 2- and 2½-in. wire cloth. The 2- to 4-in. oversize is chuted to an Allis-Chalmers 1051 Hydrocone secondary crusher, which is usually set at ¾ in. for concrete gravel production. This unit is driven by a 125-hp. motor. Crusher product is carried on a 24-in. by 86-ft. return conveyor (No. 2) back on the main conveyor.

Material through the two decks of the screen—1½-in. minus—is carried on a 30-in. by 114-ft. conveyor (No. 3) to the top of the screening tower. There it is discharged on a 5- by 14-ft. Ripl-Flo 3-deck screen which is equipped with flattened pipe sprays. In order to get a larger ¾-in. gravel, the top deck has two sections of ¾-in. and one of ⅞-in. wire cloth. The second deck has ⅜-in. cloth, and the bottom deck has two sections of ⅛-in. cloth for sand and one of ¼-in. for buckwheat. These four products—1½ in., ¾ in., ⅜ in. and buckwheat — are discharged into four 100-ton steel bins.

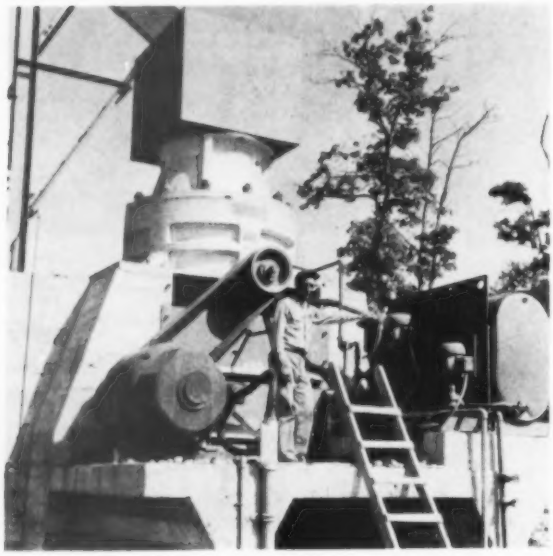
The sand through the first two sections of the bottom deck is chuted to a 4-in. by 25-ft. paddle type sand drag. A 24-in. by 100-ft. belt conveyor (No. 4) discharges the sand to a 5,000 ton stockpile. Two spray nozzles clean the ends of the paddle blades so that they don't carry water out onto the conveyor.

A Brockway 10-ton truck is used for hauling materials to stockpiles. Two Michigan 125A front-end loaders load delivery trucks from stockpiles. Shipments are weighed on a 50-ton Fairbanks-Morse scale with Printomatic and a 40-ft. concrete platform with concrete aprons at both ends. Deliveries are made by three International R 200's, one with a Heil TEC tandem, high-spill 20-ton dump trailer, and two with TEC 15-ton single dump trailers.

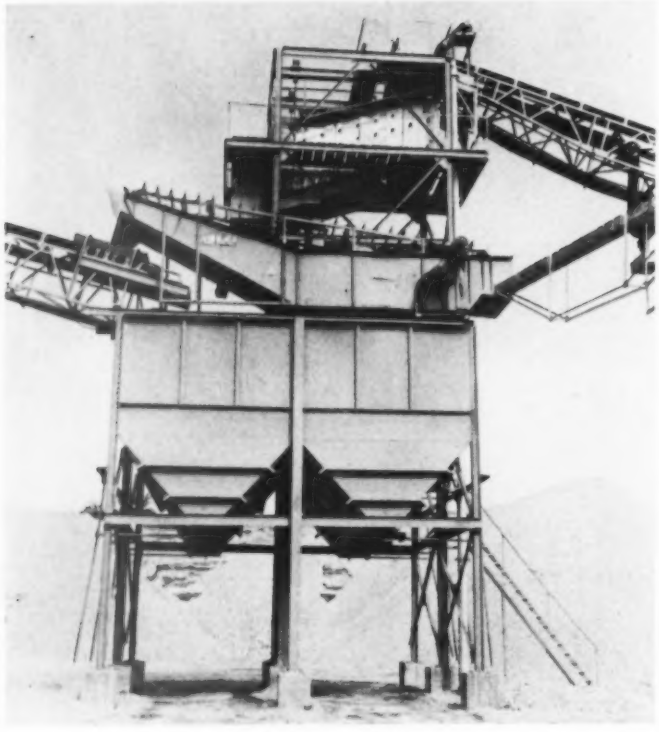
Wash water for all operations is provided from a creek near the plant by a 1,000-g.p.m. Allis-Chalmers centrifugal pump. This originally had a U bend. A new channel was cut across the top of the U and dams were put at both points, thus converting the old U channel into a settling area. Fresh water is taken out just above the upper dam. Waste water is discharged just below it. As the old river bed pond is about 100 ft. wide and 2,000 ft. long, this provides ample settling area; and the overflow into the river at the lower dam is clear water. This pond is expected to fill up in about three years after which it will be dug out.

Electric power is purchased at 4,400 v. and is reduced to 440 v. for all motors. In the transformer and switch house there is a General Electric control panel for all motors. Equipment is started manually, but there is automatic sequence stop-

(*Continued on page* 140)



The gyratory secondary crusher, with Harold Arkwell, plant superintendent, standing on the platform.



The final sizing screen and the sand drag over the bins. Sand is conveyed to the stockpile at the left.

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PREVENTIVE maintenance for crushers

By A. K. BOSZHARDT and M. P. HAHN
Processing Machinery Dept.
Allis-Chalmers Mfg. Co.

PART II—VIBRATING SCREENS

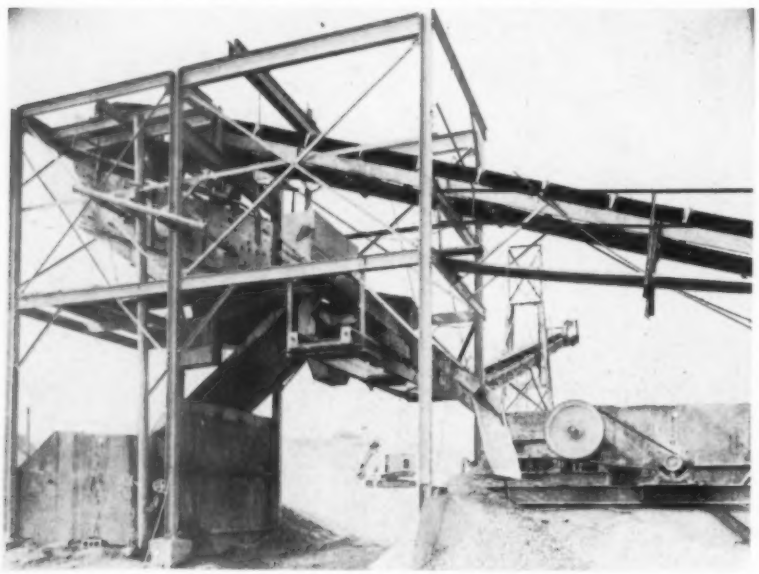
SCREEN INSTALLATION

THE screen should be installed so that it is readily accessible for changing screen surfaces, for lubrication and maintenance, or for repair. A platform or walkway should be provided with sufficient space for overhaul if this becomes necessary. If a screen is installed without convenient access, it will not be attended to regularly.

The supporting structure for a vibrating screen should be so designed that it will be strong enough to carry the load safely, and rigid enough to avoid a resonant frequency condition at the operating frequency of the screen. A resonant or near-resonant frequency condition will cause excessive building vibration. It is recommended that the natural frequency of the supporting structure be at least 1½ times the operating speed of the screen.

Long spans on beams supporting vibrating screens should be avoided. The longer the span the greater the deflection; and the greater the deflection the lower the natural frequency. If there are long spans, and if building vibration is a problem, the most effective way to correct the condition is to add at least one intermediate column to shorten the span and thereby eliminate the resonant condition.

The natural frequency of the supporting structure for a vibrating screen should be at least 1½ times the operating speed of the screen. Long spans should be avoided.

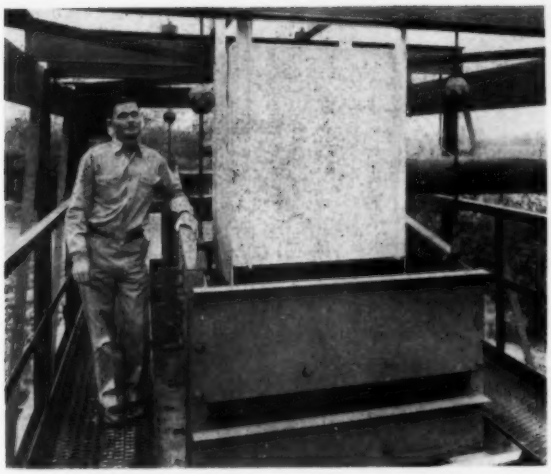


When a screen is being installed, whether floor-mounted or suspended, it is important to make certain that the springs at the feed end are compressed alike and also those at the discharge end. If the screen is floor-mounted, the supports for the spring bases must be level and in line, so that the springs will be evenly loaded. If air springs are used, those at the feed end should be inflated to the same pressure, and those at the discharge end should also be inflated equally, to obtain the working height recommended by the manufacturer. The screen should also be checked, to be sure that it is installed reasonably level in the transverse direction.

The V-belt drive should be carefully aligned, and a tension spring should be installed to maintain proper tension on the Texropes. Tension springs help to stabilize the screen longitudinally. The screen should not be pulled out of position while the tension spring is being adjusted; only sufficient tension should be provided to avoid excessive slippage during starting. The tension spring should be attached to a stationary member of the building, and a flexible steel cable should be used for the connection between the spring and the screen to eliminate whipping of the spring.

Friction checks are used to stabilize the screen in the transverse di-

and screens



Checking suspension springs on a 4- by 10-ft. double-deck screen. Whether the unit is floor-mounted or suspended, the springs at the feed end should be equally compressed. The same requirement applies to the discharge end and, on large screens, to intermittent suspension points.

rection and to snub the motion in the resonant period during starting and stopping.

Another method for obtaining a smoother stop is to use a reversing type of starter, which shortens the stopping cycle and prevents build-up motion during the resonant period.

If long cables on suspended screens cause cable whipping, a stabilizer block should be clamped to the cable. The location of the block can best be determined by trial.

FEED SPOUT DESIGN

Feed spouts should be designed to distribute the feed evenly across the width of the screen to utilize its full area. The velocity of the material fed to the screen should be held to the minimum to reduce wear and abrasion on the screen surface and to obtain good separation.

Satisfactory separation can be better accomplished if the material is delivered in line with or parallel to the longitudinal axis of the screen. For material not exceeding 2½ in., a feed chute which feeds the material onto the screen toward the feed end is recommended. The chute should be designed to incorporate a stone box, which will help to control velocity and wear and to distribute feed across the full width of the screen.

Stationary discharge spouts should be easily removable, so that worn sections of screencloth can be replaced in the minimum of time. On cable-suspended screens, if headroom is available, the discharge end of the screen can be raised, exposing this section of the screen, and thereby making changes of any worn screen surfaces on multiple deck screens relatively easy. This work requires hinged discharge spouts which can be moved out of position, so that the screen can be raised.

SCREEN CLOTH

Whenever a new screen is started up (and also after new sections of screencloth are installed), the tension on the screencloth should be checked after the first 4 hours of operation on fine screencloth and after 8 hours of operation on heavier cloth. Periodic checks for tension should be made thereafter until all the stretch is taken up.

A certain amount of stretch occurs in all sections of screencloth due to the crimps in the wires. Compression springs can be used on the tension bolts to help maintain proper tension as the cloth stretches. These springs should be compressed solidly when the cloth is tensioned.

Screencloth should be tensioned drum-tight and checked by tapping the screencloth with a hammer along the entire length of the screen between the longitudinal support bars. If the screencloth is not properly tensioned, it will whip in operation and eventually break. The rubber buffer strips between the screencloth and the longitudinal bars must be renewed when worn, so that proper support for the screencloth is maintained.

When fine, moist materials are screened, a deck-heating unit may be used to eliminate blinding and thereby increase screening capacity and improve efficiency. A deck-heating unit warms the screen surface and prevents material from adhering.

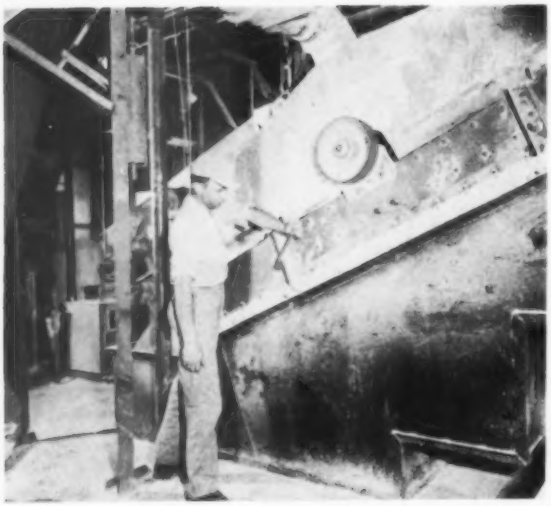
Another method of reducing blinding is to use rubber balls in trays below the screen cloth. A special frame with partitions and a ball-retaining screen section is required.

INSTALLING BOLTS

When a new screen is started, all bolts should be checked for tightness after a day's operation and periodically thereafter until the bolts are firmly seated. High-strength bolts should be checked to specified torque values.

High-strength bolts are used in clearance holes, and the parts bolted together are held in position by friction. This type of bolt is not loaded in shear. High-strength bolts, therefore, may also be used in place of turned bolts in reamed holes. Field reaming is therefore eliminated when new parts are installed.

If no torque wrench is available, sufficient high-strength fitting-up bolts should be installed to bring the parts together; then high-strength bolts are installed in the rest of the holes and tightened finger tight. Nuts should be given an additional ½ to ¾ turn, and the same pro-



Improperly tensioned screencloth will whip during operation and eventually break. This operator is conducting a periodical adjustment of tension. Rubber buffer strips supporting the screencloth should also be renewed when they show wear.

Non-vibrated screen enclosures recently made available are fixed to a foundation but permit oscillation of the screen within. Although the screen is enclosed for cleanliness, removable doors provide accessibility for general maintenance and regularly scheduled service.

cedure should be followed for the fitting-up bolts.

VIBRATING MECHANISM

A vibrating screen undergoes some of the most severe mechanical service of any machinery in a plant. It is in effect a continuous fatigue testing machine of all the materials used in its construction. The bearings in the mechanism get the most severe service. They are selected on the basis of their fatigue life, or by the number of hours they are expected to run under proper maintenance before signs of fatigue, spalling, or flaking appear.

Other types of bearing failures due to improper lubrication; abrasion; or wear due to contamination, pitting, and corrosion are regarded as preventable and therefore are not considered in estimating the probable bearing life.

Therefore, to get the expected life from the bearings, it is important that the dust seals be kept in good condition and lubrication instructions carefully followed. The type of lubricant used should be in accordance with the specifications in the instruction manual.

Extreme care should be exercised in greasing the bearings or changing the oil. Grease fittings should be carefully wiped off with a clean cloth before applying the grease gun. The lubricant must be kept in a clean place and handled in clean containers to avoid contamination.

It is important to use the lubricant recommended for the existing ambient temperature conditions. Using a lubricant that is too heavy in cold weather will result in inadequate flow when the machine is started, with resultant scoring and galling of the bearing races.

If cold water is sprayed on the screen for washing the product, it may be necessary to use a lighter lubricant to obtain proper lubrication when the screen is started and during operation. It is advisable to consult the representative of the oil company supplying the lubricant.

On grease-lubricated mechanisms a small amount of grease should be added to each bearing every eight hours during operation.

On oil-lubricated mechanisms the oil should be changed after approximately 300 hours of operation. Periodic checks should be made to be sure that the proper oil level is maintained.

The operating speed of the screen should not be increased without consulting the manufacturer, since the bearing load increases directly in proportion to the square of the speed, and the life (in hours) of the bearing varies inversely as the 10/3 power of the loading. In other words, if the bearing load is doubled, the expected bearing life is reduced to 1/10. Increasing the speed also increases the stress of all the component structural parts of the screen body.

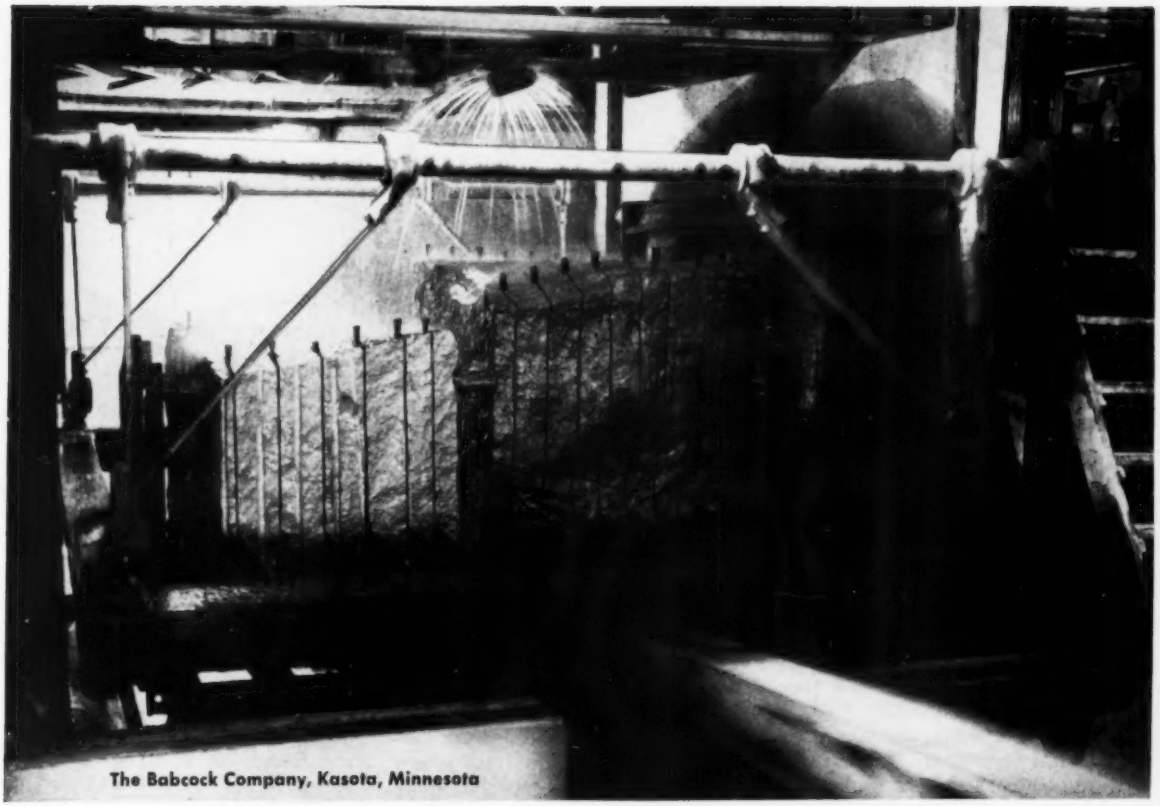
Bearing trouble can be detected by a change in the sound of the mechanism. When this occurs, a shutdown should be scheduled at once for replacing the bearing. Continued operation will eventually ruin the seal plate and spacing collar; it may cause these parts to seize, causing a complete plant shutdown.

Extreme care should be exercised in replacing bearings. This work should be done in a clean shop whenever possible. The bearing must be kept absolutely clean after the wrapping has been removed. On most screens the inner race of the bearing has an interference fit on the shaft; therefore the bearing should be heated in oil to expand it sufficiently for easy assembly. The bearing should be completely immersed in oil, which should be heated to 250 deg. F. Parts for sealing the bearing should also be cleaned before reassembling.

SPARE PARTS

It is recommended that spare parts such as bearings, seal plates, spacing collars, screen surfaces, tension plates for screen cloth, etc., be

(*Continued on page* 129)



The Babcock Company, Kasota, Minnesota

Bearings Replaced Every 11 Weeks... New Trojan HM Grease Extends Life to 18 Months!

Four generations of Babcocks have been producing "Kasota Stone." Today, Babcock is the largest producer of fabricated natural stones west of the Mississippi.

But Babcock had been having a problem with equipment on an important step in its production. The connecting rod bearings on the gang saws were burning out in less than three months. Seven different competitive greases were tried on these bearings and they continued to show an average life of only eleven weeks.

Cities Service Lubrication Engineer, Ray Brooks, was consulted and he recommended new Cities Service Trojan HM Grease. New Trojan HM contains molybdenum disulfide that has a strong affinity to metal. This causes it to adhere to the bearing surfaces even after the other lubricant has been squeezed out or washed away. Babcock lost only one of the eight bearings on the gang saw in the next year and a half. And that bearing had nearly run out its life term with the grease that preceded introduction of new Trojan HM.

The operating conditions encountered in quarries demand more of lubricants than almost any other type of operation. Shock loads, extremes in outside temperatures, water, dust and other contaminants demand high quality lubricants to safeguard your equipment and keep production up. If you have a grease problem... want to extend the period between servicing . . . call your local Cities Service office for full information on new Cities Service Trojan HM grease. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Babcock's "Kasota" Stone can be found in buildings and monuments all over the United States.

Connecting Rod Bearing that formerly lasted only eleven weeks is now used for eighteen months and longer. Seven competitive greases were tried before New Trojan HM.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Top Ranking Crushed Stone Plant Makes **16** Product Sizes

By **BUREN C. HEROD**

ONE of the most interesting operations of its type in the entire state of Iowa was placed in production by Concrete Materials and Construction Company (now a division of American-Marietta) at LeGrand.

This 2-year-old crushed stone plant, designed by company personnel, completely replaces an older facility at the same location, and incorporates some unusual and outstanding design features. Not the least of the latter is the fact that, in addition to the 1-in. roadstone and agricultural limestone which are produced in substantial tonnage, up to 16 different sizes of aggregates are made for the commercial market within the 250-sq. mile area served by the operation.

The processing flow in which this wide range of materials is produced presents some interesting points at various stages, which will be noted later. Flexibility of operation is supported by a modern, fully-interlocked system from surge pile reclamation to final screening. The surge pile installation is a highly interesting phase in its own right.

Rated at 250 to 300 t.p.h., the LeGrand plant was built by a company crew; it is equipped in all major processing phases with Iowa Manufacturing Company's Cedarrapids crushers and screens.

The area in which the quarry is situated has supported crushing operations for many years—both for the older plant of Concrete Materials, and for a predecessor producer. Current operations are carried out in a 10-acre tract where from 55 to 65 ft. of good limestone in horizontal bedding of medium thickness is available. Below this is an oölitic zone, about 17 ft. thick, which will be recovered after the primary zone has been depleted; it will be crushed for concrete stone.

Following removal of the variable-thickness overburden by a 2½-cu. yd. stripping shovel and three Euclids, two churn drills sink 6-in. blastholes—from 13 to 15 holes in a single row with a 15-ft. burden, and on 17-ft. centers. These are charged with DuPont high explosive and ammonium nitrate in the proportions of about 25 lb. of dynamite per 100 lb. of nitrate. Total charge weight per hole is about 500 lb. The charges are detonated by Primacord; and the yield has averaged 2¼ tons per pound of explosive.

Broken stone is loaded out by a 2½-cu. yd. Bucyrus-Erie shovel, and hauled to the primary crushing installation in a pair of Euclid 8TD 22-ton end-dump trucks.

As discharged into the dump hopper, the quarry-run material is transferred on a 40-in. by 14-ft. apron feeder to the 4350 Cedarapids double-impeller impact breaker. One impeller is driven by a 150-hp. motor and the other by a 125-hp. unit. Both are G-E equipment, as are all large motors throughout the operation.

A rock box at the discharge of the primary crusher retards the flow of crusher-run material as it is chuted to a 36-in. by 110-ft. sta-

One of the most interesting physical features of the LeGrand operation is the surge piling installation, left, which places a semi-circular stockpile of crusher-run material above a Y-shaped layout of reclaiming tunnels.

C. W. "Bill" Carson, right, a 25-year veteran with the company, is plant superintendent. Joe Foreman, left, is foreman.

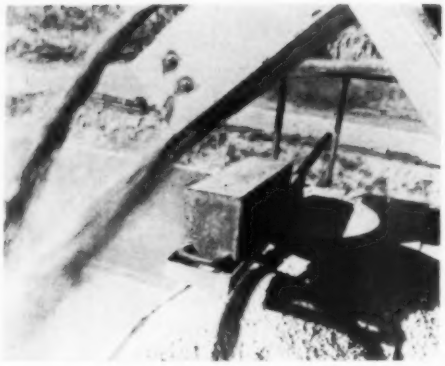
Above: From 55 to 65 ft. of this medium-bedded limestone is currently being worked in the quarry. A 17-ft. thick zone immediately below this face will be recovered later.

Right: A view of the primary crusher installation and the double-impeller impact breaker. Note the louvered and hinge-sided housings over the impeller drive motors.

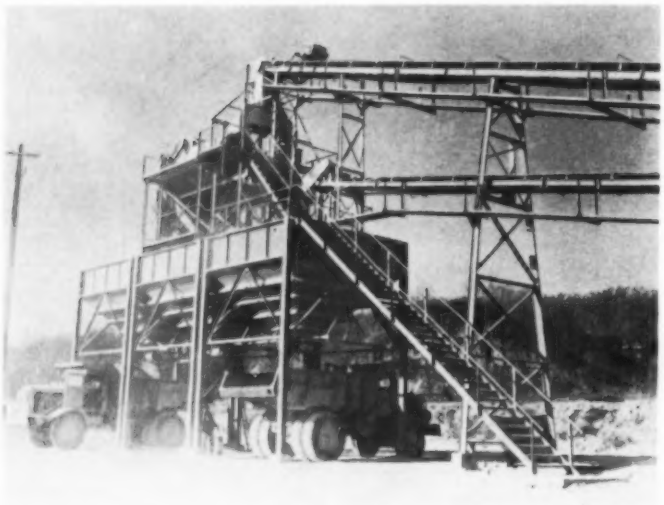
Above: One of the vibrating feeders installed in each of the wing reclaiming tunnels under the surge pile.

Right: The stacker conveyor is fitted with a 36-in. wide belt, and is 80 ft. long from pivot, right, to the discharge point. It is propelled on its rail by a pair of 5-hp. motors, and supplies a surge pile of about 30,000 tons.

Left: Another example of the versatile design. Secondery crusher products are split in any desired amount through the pants-leg to the main feed belt, left, and a parallel belt, right, leading to the primary screens. (See text.)

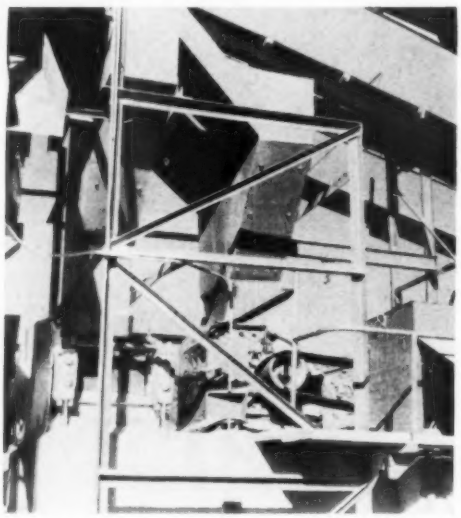


Above: Shown here is a turn-table-mounted sampler box which is swung into the stream of screen discharge, left, for rapid collection of samples of material in flow.



The final screening tower, and truck-loading bins. Fines have been removed from the feed to these identical screens earlier in the flow.

Top-deck retained material from the two primary screens is chuted to the secondary hammermill, right center, and that from the middle decks to the secondary double-roll crusher, left center.



Left: Contact haulage units are loaded from stockpiles, as shown here, or directly from the bins below the finishing screens.

tionary inclined conveyor that leads to the surge piling installation.

The latter is comprised of a self-propelled rail-mounted radial stacker, a type of installation frequently found in stockpiling finished products from a processing line, but infrequently seen on primary surge piling.

Traveling on a rail arc of slightly more than 180 degrees, the stacker conveyor carries a 36-in. belt driven by a 60-hp. motor, and is 80 ft. long from pivot to discharge point. It is propelled by a pair of 5-hp. motors, and discharges the 5-in. stone received from the primary conveyor onto a stockpile that has a capacity of approximately 30,000 tons.

Among the obvious advantages of this design is the fact that this quantity of stone can be placed in a radial pile from a lower, shorter conveyor system than would be required to clear a conical pile of the same volume. The element of clearance between the primary crusher and surge pile is also present since the pile created is not so high that it would result in an excessively wide base of the cone.

Two lateral or "wing" reclaiming tunnels were constructed to reclaim from the two halves of the surge pile arc. Built of reinforced concrete, each of the two "wings" is 7½ ft. square, inside dimension, and houses three feeders (Syntrons and apron units). These connect with a tunnel that forms the leg of a "Y", and houses the first section of the plant feed belt.

The reclaiming tunnel feeders are the initial operating units in the plant's interlocked control system, and they are automatically shut down when any component between the tunnels and the final screens stops for any reason.

Each "wing" tunnel houses a 30-in. by 100-ft. reclaiming belt which discharges to the 36-in. by 155-ft. plant feed belt. At the top of the primary screen tower, the latter conveyor discharges through a pants-leg chute to a pair of high-torque 4- by 14-ft. horizontal, triple-deck screens.

Due to the wide range of products noted earlier, screencloth on these screens and those on the final screening tower, is frequently varied. However, the top deck on each of the primary screens is generally fitted with 2½-in. opening cloth.

The material retained on the upper deck of each screen is chuted to a 40-in. hammermill, driven by a 150-hp. motor, and the fraction from the middle decks of the two screens is chuted to a 24x40 double-roll crusher. Both of these secondary reduction units discharge to the same return 30-in. by 35-ft. conveyor, but the circuit is closed with a system that displays the careful attention given to efficient production in the plant design.

In lieu of placing the full load of secondary crusher products on the plant feed belt (although the discharge of the latter is split to the two primary screens), the discharge from the secondary crusher return conveyor is split through another pants-leg chute to place a part of the material on the main feed belt (36 in. wide), and the balance on a parallel 30-in. belt from which the material is fed to only one of the two screens. Thus both primary and secondary crusher-run are evenly divided between the two primary screening units.

The fraction retained on the lower deck of each of the latter units is chuted to a 30-in. by 125-ft. conveyor that connects with the final screen tower. Material passing both lower decks is received on a 24-in. by 112-ft. belt and is also transferred to the final screen tower, where it is discharged directly into loading bins.

Actually, when roadstone and agstone are the basic products in process, both belts from the primary tower discharge into the bins below the final screens. When "clean" stone fractions are in process, the larger belt noted above discharges through a pants-leg to the pair of double-deck horizontal 4- by 12-ft. final screens. Fines, however, have already been removed from the final screen feed as noted above.

The latter screens are mounted above a set of three 100-ton bins. Fractions from the two upper decks, and those from the two lower decks, are chuted into the respective one of two bins. (The same screening surface is used on comparable decks of both units.) Bottom deck throughs are chuted to the third ("dust") bin.

Contract haulage units are loaded directly from these bins or from stockpiles by a Scoopmobile front-end loader, and are weighed out over a 30-ton Fairbanks-Morse truck scale.

Operations of this efficient and interesting plant are handled by a 10-man crew under the supervision of C. W. "Bill" Carson, superintendent—a 25-year veteran with the company, and Joe Foreman, whose job and name are the same. In addition to this modern operation, Concrete Materials has eight other aggregate production locations in Iowa, plus plants in both Kansas and Missouri. Headquarters are in Cedar Rapids, Iowa.

Top officials of this division include S. P. Moore, chairman; F. E. Bellamy, president; K. K. Kinsey, executive vice-president; Marvin Nelson, general manager; Max Oelschlaeger, crushed stone production manager (Iowa, Missouri); Dean Curphy, crushed stone production manager (Kansas); and W. W. Roberts, sand and gravel production manager.

Preventive Maintenance

(*Continued from page 124*)

kept on hand. It is further recommended that the bearings be purchased from the screen manufacturer. In most cases the bearings used in vibrating screens are selected for closer tolerance on the outside diameters and with greater than standard clearance between the rollers and the races. Moreover, some screens are so arranged that the lubricant is applied in the center of the bearing. This requires a bearing with a circumferential groove and radial holes in the outer race.

SUMMARY

A vibrating screen should be considered a high-class piece of equipment, which does an important job in the operation of a plant. A screen out of service may shut down an entire plant. The mechanism which comprises the heart of the screen is built like a precision instrument; therefore it should be so considered and maintained accordingly. If the operator realizes these facts and gives the proper attention to the screen, it should render years of trouble-free performance.

Air Force Base Construction Supplied by Portable Plants

TO SUPPLY 1,000 tons of aggregate for the proposed construction of the Bong Air Force Base at Kansasville, Wis., Kimmes-Barthelma Construction Company, Hastings, Minn., installed portable crushing-and-screening plants at a pit three miles from the construction site. Here material was crushed and sized, and then trucked to a pug mill at the job location, where sand, natural gravel, and crushed gravel were remixed, moistened, and used as a sub base for runways, taxiways, and aprons.

The pit deposit consisted of limestone gravel, with a 70-percent silica content, and approximately 15 percent of the material had to be crushed.

The contract specified base materials for both flexible and rigid pavement. Aggregates for the base under the rigid pavement and the sub base of the flexible pavement consisted of natural or processed and blended gravel, sand mixtures, crushed gravel, crushed stone, natural or manufactured sand, and other approved materials naturally combined or processed and blended.

The aggregates for the upper base under the flexible pavement consisted of crushed gravel or crushed stone. Specifications called for all aggregates free of clay, organic matter, or other foreign material. In screening, the particles retained by a No. 4 sieve were considered coarse aggregate, and the material passing through the sieve was used as a binder.

The crushing operation began on June 25 last year and was halted on October 4, when the Air Force cancelled all construction on the 5,400-acre base because its new strategy called for the B-58 bombers that were to be stationed at Bong to be based overseas.

At the plant, pit-run material was

Left: A twin-jaw scalping unit removed about 90 percent of the sand and served as a primary crusher.

Below: A general view of the portable crushing and screening units that supplied the aggregates for the air base paving sub-base.

bulldozed into a bulkhead feeder hopper by four HD-16CB Allis-Chalmers crawler tractors and carried by a Kolman conveyor to a portable Cedarapids TW-3B twin-jaw scalping unit. In the latter, a horizontal vibrating scalper screen removed the oversize, and about 90 percent of the sand in the feed was separated and carried by a side conveyor to an Alby surge bin.

Oversize was delivered to the 1836 twin-jaw crusher, and the minus 4-in. products of primary reduction were conveyed to the following Super-Commander tandem crushing and screening plant for final processing.

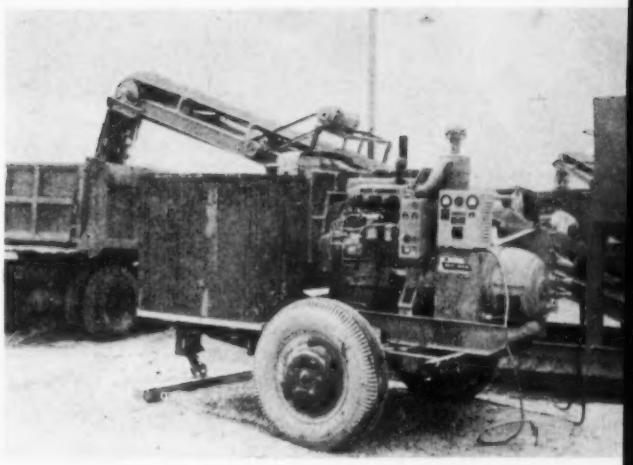
Separation was made on the 48-in. x 14-ft. triple-deck, horizontal vibrating screen, with top- and middle-deck fractions chuted to a 1236 twin-jaw crusher and a 3025 roll. Discharge from the crushers returned to the screen in closed circuit. Finished fractions were conveyed to portable Alby bins.

These operations produced 8,000 tons of sand, gravel, and crushed gravel daily, which were transported three miles to the pug mill at the air base by a fleet of 30 trucks. Each truck had a capacity of 10 cu. yd.; and the average number of truckloads hauled daily was 350.

The crushing plant was powered by a generator set which developed 40 kw., 240 v., at 1,800 r.p.m. A pair of 10 hp. electric motors provided power for conveyors leading from the surge bins to the trucks. These were among the 18 Allis-Chalmers power units used throughout the operation.

Sand and gravel were stored separately at the pug mill site, and two Allis-Chalmers crawler tractors pushed the materials into hoppers of the Kolman conveyors. The materials were then transferred to a Boardman pug mill for blending and moistening. Power for the pug mill was provided by an Allis-Chalmers power unit driving a 10-kw. generator. Trucks were loaded from the pug mill hopper for haulage of the stabilized mixes to the airport paving sites.

The crushing plant was operated 20 hours per day and produced between 350 and 400 t.p.h. of aggregate ranging from 1½ in. to ½ in., and ½ in. to 0 in.



A belt-driven generator provided auxiliary power for lighting and driving fuel and water pumps at the pit.

At the air base sand and coarse aggregates were stored separately and loaded into the pug mill by diesel-powered conveyors.

Four crawler tractors pushed raw materials into a twin-jaw scalping unit at the pit.

ABOUT PAGE ENGINEERING COMPANY

Mr. John W. Page founded the Page Engineering Company in 1904 and he is still actively engaged with the organization. While dredging for the Hennepin Canal in Illinois, he first devised the drag-line principle for earth-moving. The company's buckets are busy in strip-mine machines in sub-arctic Canada, and in moving hot slag in steel mills, often at 800 degrees Fahrenheit.

APPLICATION DATA

Page bucket weldments are now made with McKay Tube-Alloy 218-0 wire on a semi-automatic welder with open arc. Deposition of weldment is at the rate of 12-15 pounds per hour.

Enter 132 on card, page 173

McKAY

TUBE-ALLOY 218-0 WIRE

...takes a $36,000 yearly bite out of drag-line bucket costs

"McKay Tube-Alloy 218-0 semi-automatic welding wire enabled us to greatly reduce our costs in producing drag-line buckets," says superintendent Mr. G. E. Steil, Page Engineering Co., McCook, Illinois, "yet we were still able to maintain the same high strength requirements previously obtained using stainless steel manual electrodes."

The teeth and lips of Page buckets take a tremendous beating in all sorts of terrain, including huge layers of overburden in coal strip mining and large fragments of blasted rock in quarries. To meet these extreme service conditions, Page welds a manganese steel lip to the low alloy hi-strength steel bucket.

"We selected McKay Tube-Alloy 218-0 wire because this was the only type of welding wire with which we could get a weld that retained the same physical strengths formerly obtained with stainless electrodes."

Many manufacturers are converting to automatic and semi-automatic welding to obtain faster, more uniform depositions and to reduce down-time. If you are considering such a change-over, McKay Hard Surfacing Field Engineers will assist in developing the most efficient and economical procedures for the application of McKay Tube-Alloy Welding Wires.

Write for Hard Surfacing Catalogs

PQ-1 Contains full information on all McKay Hardalloy hard surfacing electrodes and Tube-Alloy welding wires, plus a check list of over 500 applications.

PQ-2 Earth Moving Equipment Manual provides detailed procedures for deposition of alloys for proper build-up and/or hard surfacing of parts used for heavy earth moving equipment.

"We have not experienced a single rupture of a joint welded with the McKay Tube-Alloy 218-0 Wire," said Mr. G. E. Steil, Superintendent, Page Engineering Co.

THE McKAY COMPANY

1005 LIBERTY AVE. · PITTSBURGH 22, PA.

Standard conveyor system shown handles aggregates used in new concrete block plant producing 35,000 blocks daily. Owner appraisal: "We thought the new conveyor would require a week to get the bugs out . . . but it operated trouble-free right from the start."

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You can find out how much you'll save merely by calling your nearby Barber-Greene Conveyor Representative. He will quickly quote you money-saving prices on either your entire system or on whatever conveyor equipment you need. Call today.

Redi-Fab conveyor shuttles aggregates from crushers to screens to stockpiles in this modern plant. Low maintenance torque arm drives are used. Redi-Fab units offer immediate selection, fastest delivery and erection, easiest alteration, and heavy duty construction.

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YOU SAVE ON ANY SIZE JOB

You can benefit from these savings whether your conveyor is fabricated from channel frame or giant gallery truss, whether capacities handled are a few hundred or thousands of tons hourly, or whether belt widths are 18 or 60 inches.

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Captive Requirements, Open Market Supplied by New Crushed Stone Plant

do-it-yourself production stems from special product shortage

ANOTHER ON THE SPOT report

IF you can't buy it, make it. This logical solution to a problem of local unavailability of certain materials involved the development and erection of a new quarry and crushed stone plant at Willard, Mo., a few miles northwest of Springfield.

The Graystone Quarry Company, a subsidiary of Masters-Jackson Paving Company, was organized and went into operation about 18 months ago, primarily to provide a steady source of material for the latter firm's paving activities. Unable to obtain paving materials in the area in sufficient quantity, the Masters-Jackson officials decided to construct a plant that would meet their needs. Special aggregates, such as chips, were a particular objective in these plans since the materials were not available and were badly needed to supply the firm's bituminous concrete mixing plant.

As of today, the Graystone quarry and plant not only meet all demands of the above operation, but can also consign more than one-half of production to the open market. Designed by George Baker, superintendent, who has a background in both crushed stone operations and mining (he was formerly an owner-operator near Lockwood, Mo.), the plant has a capacity of 200- to 225-t.p.h. on base stone. When the plant is producing primarily chips, capacity is about 25 percent below those rates.

In addition to three basic sizes of bituminous concrete aggregates, the main products include roadstone and two size ranges of filter material. Truck shipments are made within a radius of 50 miles, and rail shipments, originating on the plant's spur from the Frisco R.R. mainline, are made up to 100 miles. Filter media has been shipped as far as Omaha, Nebr.

Originally set up as a semi-portable installation, the plant was subsequently revamped and is now a permanent facility. It is located on a tract that includes the quarry and reserve stone area, and adjoins the site of the Masters-Jackson bituminous plant and construction equipment garage.

The Burlington limestone exposed in the quarrying operations was test-drilled to depths ranging up to 123 ft. of good stone prior to initial development. Samples tested at 32 in the Los Angeles abrasion machine (28.6 for stone from the lower 20 ft.), and absorption averages less than 1. Under the Missouri method of computing abrasion in the Deval machine, the French coefficient of wear is 7-8.

Overburden above the formation

Compactness of the 225-t.p.h. plant is evident in this general view. Finished products are loaded out directly for truck shipment, or to stockpiles for subsequent loading to trucks or rail cars.

In blast hole drilling at Graystone, 3-in. holes are sunk on a 6- by 9-ft. pattern, and from 40 to 60 holes are drilled for each shot.

By BUREN C. HEROD

is generally thin, and is readily removed by a Caterpillar D7 bulldozer. Blast holes are sunk by a Joy TM450 drill supplied with air by a Joy 600 compressor. The 3-in. holes are drilled on a 6- by 9-ft. pattern, to a depth of 20 to 25 ft. (currently), and from 40 to 60 holes are drilled for a shot.

Explosives used include Atlas, DuPont, and Hercules products. The greater poundage is of pre-mixed ammonium nitrate blasting agents, and the balance of 60 percent gel. In a good dry hole the charge is comprised of 85 percent nitrate and 15 percent gel. All holes are fired from the bottom with dynamite and blasting caps, and the charges are energized on millisecond delay. The percentage of gel in each hole, above the minimum of 15, is increased directly with the amount of water that may be present.

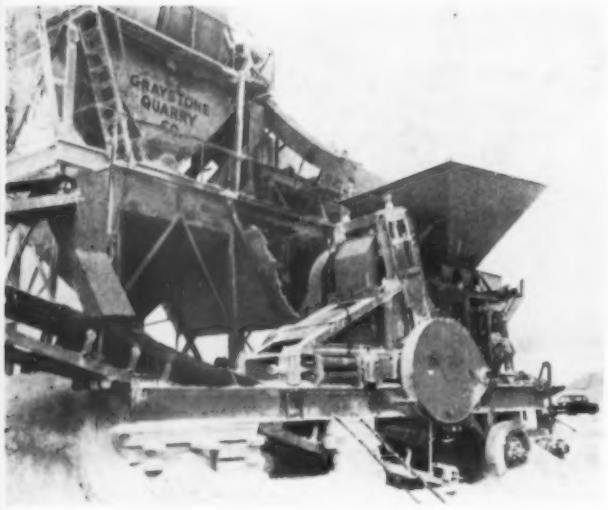
The toughness and resistance of the stone, which in place is relatively massively-bedded below the top few feet, results in an average yield of slightly under 2 tons per pound of explosive used. Secondary breakage, as required, is done with jackhammers.

Broken stone is loaded out with a 1¼-cu. yd. Cummins diesel-powered Lorain shovel, and the quarry-run material is hauled to the plant by a pair of 16-ton end-dump Euclids.

At the plant, in which most of the primary processing components are Cedarapids equipment (including feeder, primary jaw, secondary im-

Above: The 1¼-cu. yd. shovel and one of the two 16-ton end-dump trucks used for loading and hauling of quarry-run material.

Right: Secondary reduction is done with this single-impeller impact breaker that is fed directly from the primary crusher by the conveyor section at the left.



The triple-roll tertiary crusher is fed plus 1-in. material from the top deck of the primary screen, upper left; and products are returned to the screen feed belt in closed circuit.

pact breaker, and screens), the flow is initiated on a 36-in. by 14-ft. apron feeder at the truck dump hopper.

Stone delivered to the 100-hp. 25x40 primary jaw crusher is reduced through a 7½-in. closed side setting. Crusher discharge is received on an inclined belt which is one of two 36-in. wide conveyor sections installed in tandem on a single framework. This somewhat unusual arrangement was made in order to expedite the conversion of the original plant from its semi-portable status to a permanent installation, and to retain compactness.

The second section of this conveyor, as noted below, supplies the screening phase of the plant; the initial section, 25 ft. o.c., transfers the primary crusher discharge directly to the secondary crusher.

This 20x30 single-impeller unit is driven by a 150-hp. motor. Products of this secondary reduction are delivered to the first of two 30-in. wide belts (40 and 60 ft. o.c., respectively), on which they are transferred to the 36-in. by 65-ft. second section of the conveyor described above for delivery to screening.

Two horizontal, triple-deck screens are used for sizing. These are mounted in tandem above a set of four truck-loading bins with individual 25-ton capacities. The primary screen, a 5- by 16-ft. unit, may, for example, make separation with screencloth of 1- or 9/16-in. openings on the top deck, 5/16-in. on the middle, and 8-mesh on the bottom.

In the above example, and unless filter media is in process, the top-deck retained fraction is chuted to the tertiary crusher. Middle- and bottom-deck retained fractions are chuted to the top and bottom decks, respectively, of the following secondary screen, and the minus 8-mesh material is dropped into a bin.

Tertiary reduction is accomplished with a 24x54 Pioneer triple-roll crusher driven by a 150-hp. motor. Products of tertiary reduction are transferred on the 30-in. by 60-ft. conveyor noted above to the primary screen feed belt.

The secondary screen, a 4- by 14-ft. unit, is usually fitted during normal bituminous aggregate production with 9/16- and 5/16-in. opening screencloth on the upper and middle decks, respectively, and 8-mesh cloth on the bottom deck. These various finished products are dropped into the appropriate underlying truck-loading bins.

With the setup described above, the operation produces the three basic sizes of bituminous aggregates required for the mixing plant of the paving company. These are 1- by 9/16-in., 9/16- by 5/16-in., and 5/16-in. by 8-mesh. With appropriate screencloth changes, plus 1-in. roadstone, and the filter media stone (4- by 2-in. and 3- by 2½-in.) may be pulled off the primary screen.

Truck shipments may be loaded directly from the screen bins or from material stockpiles. Loading from the latter is handled by a pair of Allis-Chalmers TL20D Tracto-loaders. Rail cars are loaded *via* a track-side truck ramp from the screen bins or stockpiles. However, the front-end loaders may also be pressed into service for transfer of stockpiled products into the rail gondolas.

Materials required for the semi-permanent Cedarapids Model H

Special crushed stone materials required by this batch-type asphalt plant were a prime factor leading to the development and construction of the new crushed stone operation.

GET THE MOST

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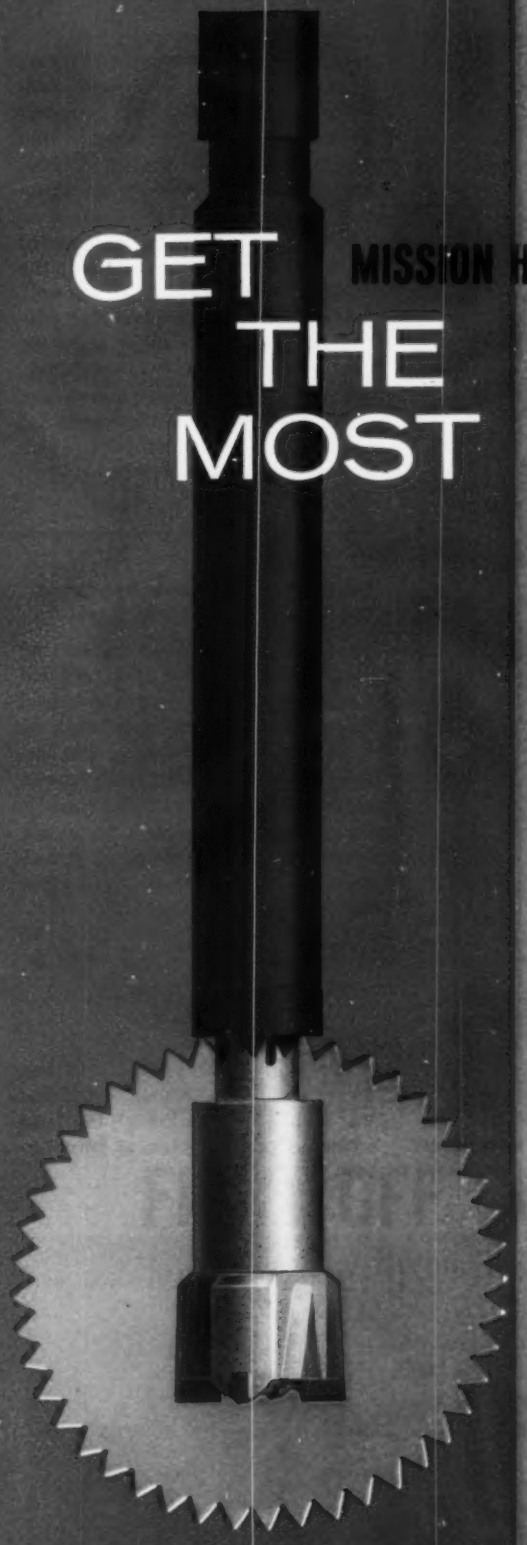

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Right: Front-end loaders used for truck loading from stockpiles are also used at times to transfer products from the latter in loading rail cars.

T40 batch-plant operated by Masters-Jackson are trucked from the crushed stone plant to stockpiles near the mixing facility, and are rehandled by clamshell crane. Approximately 20 haulage trucks are maintained by Masters-Jackson at this operation, and this fleet is also used for truck shipment from the crushed stone plant to open-market customers.

Under the supervision of Mr. Baker, operations of the quarry and crushing plant are handled by an 8-man production crew, and a loader operator. Although originally established as a more or less captive source of supply, this compact installation has attained considerable success commercially. Top officials are E. Jackson, president, and H. W. Masters, secretary-treasurer.

George Baker, superintendent of the Graystone Quarry Co. operations, has had broad experience in both the crushed stone and nonmetallics mining fields.

N. Hampshire Combination

(*Continued from page 120*)

ping. If any item of equipment fails, everything ahead of it is automatically stopped; if the water pump fails, everything is stopped. Allis-Chalmers motors are used throughout.

All belt conveyors have Stephens-Adamson Saco speed reducers, all single-reduction and V-belt except the No. 1 main conveyor, which has a double-reduction reducer and chain. S-A conveyor idlers and pulleys are used. All conveyors have automatic holdbacks, and the three longest ones have automatic take-ups.

A garage building at the plant houses the trucks, loaders, and equipment for making minor repairs. There is also a Chevrolet panel service truck with an Onan portable welder which serves all plants.

This plant was designed by the Eastern Eng. and Sales Co. of Quincy, Mass., which made the conveyor frames, structural work, hoppers and the sand drag, and supplied the belt conveyors and other items. Eesco also supervised construction of the plant by company forces. This plant has done all that it was designed for and is of modern all-steel and concrete construction.

The Rochester plant is operated by a crew of five men, including the superintendent, Harold Arkwell. The use of stockpiles makes it possible to operate the plant when the men are not needed for other work. All the delivery truck drivers can operate loaders to fill their trucks at any time. Maintenance work is also done during slack periods.

One of the delivery trucks and the tractor loader at the stockpile.

Practical Handbook Published On Reducing Electric Costs

A 235-page practical engineering guide to lower power costs, entitled *Electrical Efficiency in Industrial Plants,* was recently published by F. W. Dodge Corporation. The author is Edwin S. Lincoln, veteran electrical consultant. This book is reportedly the first text to attack specifically the problems of reducing costs of electric power and lighting in industrial plants.

Copies are available at $9.50 each from the publisher, 119 W. 40th St., N. Y. 18, N. Y.

RAY H. MACFETRIDGE died last December in Birmingham, Ala. He was manager of the Lehigh Portland Cement Company plant at Birmingham.

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United States Rubber

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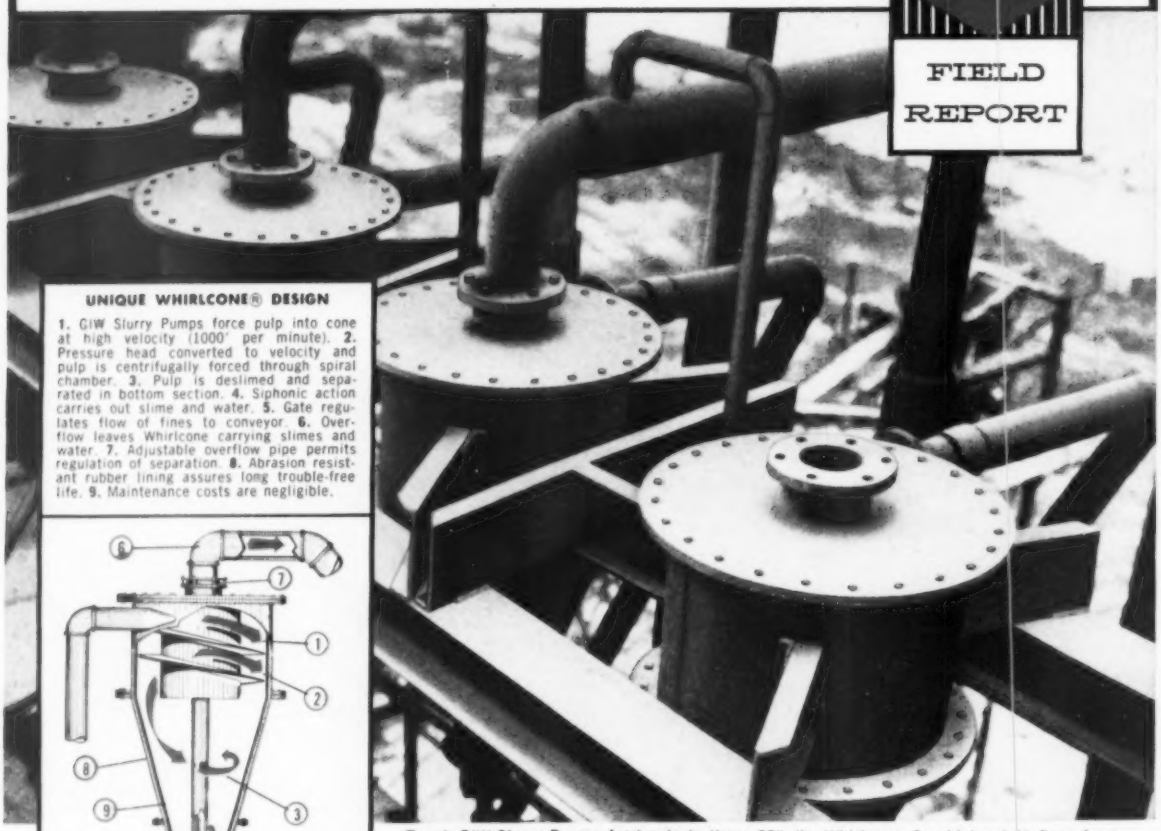
COTTRELL WHIRLCONE® SEPARATORS

customer:

BECKER COUNTY SAND & GRAVEL CO.

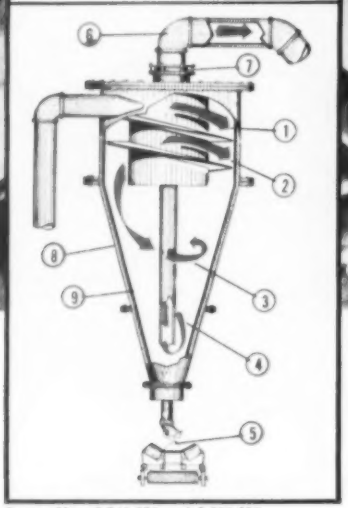
GIW

FIELD REPORT



UNIQUE WHIRLCONE® DESIGN

1. GIW Slurry Pumps force pulp into cone at high velocity (1000' per minute). 2. Pressure head converted to velocity and pulp is centrifugally forced through spiral chamber. 3. Pulp is deslimed and separated in bottom section. 4. Siphonic action carries out slime and water. 5. Gate regulates flow of fines to conveyor. 6. Overflow leaves Whirlcone carrying slimes and water. 7. Adjustable overflow pipe permits regulation of separation. 8. Abrasion resistant rubber lining assures long trouble-free life. 9. Maintenance costs are negligible.



Patent Nos. 2,758,070 and 2,806,599

Tough GIW Slurry Pumps feed pulp to these 25" dia. Whirlcones®, which retain fines from classifier overflow. Maximum recovery rate is 20 tons per hour per cyclone. The cones will handle material from −12 mesh to lightest slime.

Whirlcone® Separators solve difficult fine recovery problems.

The retention of fines in the −50 plus 200 mesh range posed a disturbing problem for the Becker County Sand & Gravel Co., of Cheraw, S.C., primarily because the large amount of water used in processing the sand and gravel washed out the desirable fines with the minus 200 slimes.

Fourteen 25" dia. Whirlcone® wet type cyclones installed parallel in four Becker plants solved this problem completely. Operating an average of 8 hours daily, they extract up to 100 tons of clean, fine sand per hour from wash water while the minus 200 mesh slime is discarded.

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Why Crankshafts Fail

By W. E. IRWIN
Manager, Service Department
Caterpillar Tractor Company
Industrial Engine Plant

ANOTHER P&D EXCLUSIVE

WHEN a major mechanical failure occurs to an engine, it is a natural reaction for the owner to blame the manufacturer. Company representatives, investigating such failures, are often met with such remarks as, "Your engine broke a crankshaft and ruined our torque converter," or "Your engine has failed, and we expect you to give us a new engine, or at least a new crankshaft and cylinder block."

Although engine builders often recompense owners for engine damage resulting from crankshafts and other engine components that fail because of "defects in materials or workmanship," facts accumulated for many years prove that *crankshaft failures are more often caused by some external force or condition.*

No matter who builds the engine, crankshafts and bearings are not designed to withstand the extreme stresses that can be exerted on them when various types of power take-offs are misaligned, improperly positioned endwise, or so designed that they can exert abnormal forces on the crankshaft.

Recently a relatively new engine on a drilling rig had a severe seizure of the rear main bearing which ruined the crankshaft, as well as the cylinder block, causing damage amounting to nearly $10,000. The engine was driving directly into an air clutch. An on-the-job check revealed that the inner drum of the clutch was extremely misaligned in relation to the outer drive ring. The extreme side loads exerted on this engine's flywheel and crankshaft caused the rear main bearing to seize the full length of its bore, generating so much heat that both the crankshaft forging and cylinder block casting cracked beyond repair.

Alignment of air clutches is critical. The higher the air pressure in the boot, the closer the alignment must be to keep the side loads within safe limits. Misaligned air clutches can cause failure to any member to which they are fastened, whether it is a diesel engine, a torque converter, a compound, a pump, or some other attachment.

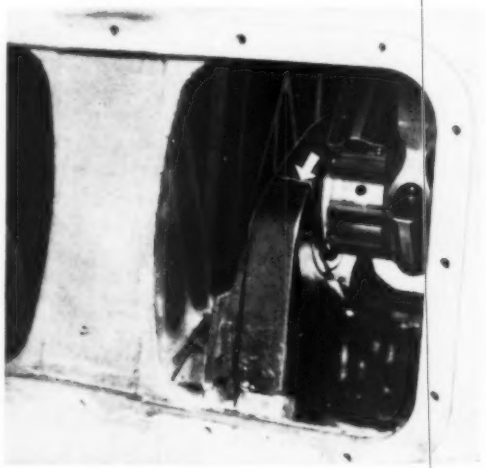
In another case there were rear main (thrust) bearing failures in several diesel engines powering torque-converter-equipped excavators. The front thrust flange of the rear main bearing became badly scored and, in some cases, broke off. It was found that the power train design allowed the torque converter to exert a linear pull on the crankshaft with thousands of pounds of force under full load conditions. The design was changed by the excavator manufacturer to include a thrust bearing to absorb the pull of the torque converter. In addition, the solid connection of the torque converter shaft to the flywheel was redesigned, with the result that bearing and crankshaft failures were eliminated.

Improper shimming caused several thousands of dollars damage to another new engine on a drilling rig. In this case, the engine was driving through a coupling into a torque converter, and the torque converter was driving into an air clutch. The coupling between the engine and the torque converter was not properly shimmed to allow the crankshaft to float. Instead, the crankshaft was pushed forward with great force.

The result was that the rear flange of the rear main bearing was broken off completely. The engine was run

Left: Improper shimming caused this crankshaft failure. The crankshaft broke, as shown, the cylinder block cracked, and the rear faces of all the main bearing caps and supports in the block were gouged because of a great forward thrust on the crankshaft.

High-bending-type loads on a crankshaft will usually result in a break which starts in the fillet and progresses through the web.



Torsional vibration fractures are characterized by a break at a 45-degree angle, usually toward the rear of the engine.

to destruction as the crankshaft broke through the web adjacent to the rear main bearing. The cylinder b'ock was cracked through the rear bearing web, and the rear faces of all the main bearing caps and supports in the block were severely gouged because of the great forward thrust put on the crankshaft.

It was also found that the air clutch, fastened to the output shaft of the torque converter was grossly misaligned, a situation which, in all probability, was responsible for complete failure of the torque converter.

Various physical and metallurgical analyses can be employed to determine whether a particular crankshaft failure was caused by manufacturing defects. The type of failure also tells much about the cause and gives clues helpful in correcting the problem and preventing recurring failures.

Typical failures may fall into one of the following categories:

1. Side loads on the crankshaft can break down the oil film in the bearing, causing seizure. High end loads on the crankshaft not only can score the thrust surfaces of the bearings, but can generate enough heat to reduce the bearing clearance to the point of seizure. Continued running will usually result in a jagged, complete crankshaft fracture near the fillet.

2. High-bending-type loads, usually from misalignment of driven machinery, can start a crack in the fillet at the main bearing journal which progresses through the web to the adjacent rod bearing journal.

3. Torsional vibration normally fractures a crankshaft at a 45-degree angle. The wide use of torsional vibration dampers keeps this type of failure to the minimum. However, the damper can become overloaded because of added driven equipment, or the damper can become damaged. Overspeeding may introduce additional torsional vibrations that can be damaging.

Modern, heavy-duty diesel crankshafts and bearings are not usually manufactured with defects. Failures are usually the result of external forces created by conditions beyond the control of the manufacturer. Physical and metallurgical tests can show whether or not the engine builder is at fault.

Talc, Soapstone, Pyrophyllite Show Production Increase in '59

Combined production of talc, soapstone, and pyrophyllite increased 5 percent in 1959 over 1958, according to preliminary estimates of the U.S. Bureau of Mines. The increase was attributed to greater demand for all major uses —ceramics, paints, insecticides, rubber, and roofing. 1958 production had increased 8 percent from 1957.

Increased output was reported from 11 of the 14 producing states, with New York, California, and North Carolina continuing as the leading producers. Substantial tonnages also were reported from Vermont, Texas, Georgia, and Montana.

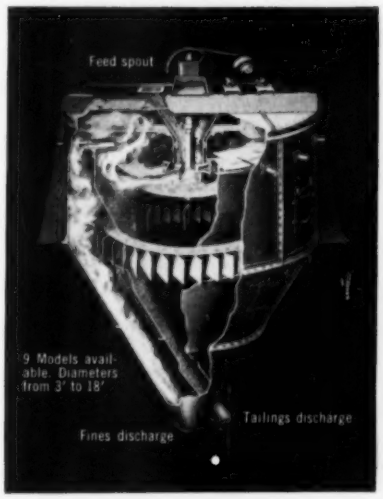
In October Newfoundland Minerals, Ltd., Manuels, Newfoundland, made an initial shipment of 2,924 short tons of crude pyrophyllite to its present company, American Encaustic Tiling Company, Inc., Landsdale, Pa., for use in manufacturing tile.

1959 Output and Value Increases For Domestic Clay Producers

Combined production of ball clay, bentonite, fire clay, fuller's earth, kaolin, and miscellaneous clay increased 7 percent in quantity and 13 percent in value during 1959, according to preliminary estimates made by the U.S. Bureau of Mines.

Production totalled 46,936,000 short tons, valued at $162,409,000 —compared with 43,750,000 short tons, valued at $143,487,000 during 1958.

In Cement and Aggregates the Word for Air Separation is "Sturtevant"



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Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

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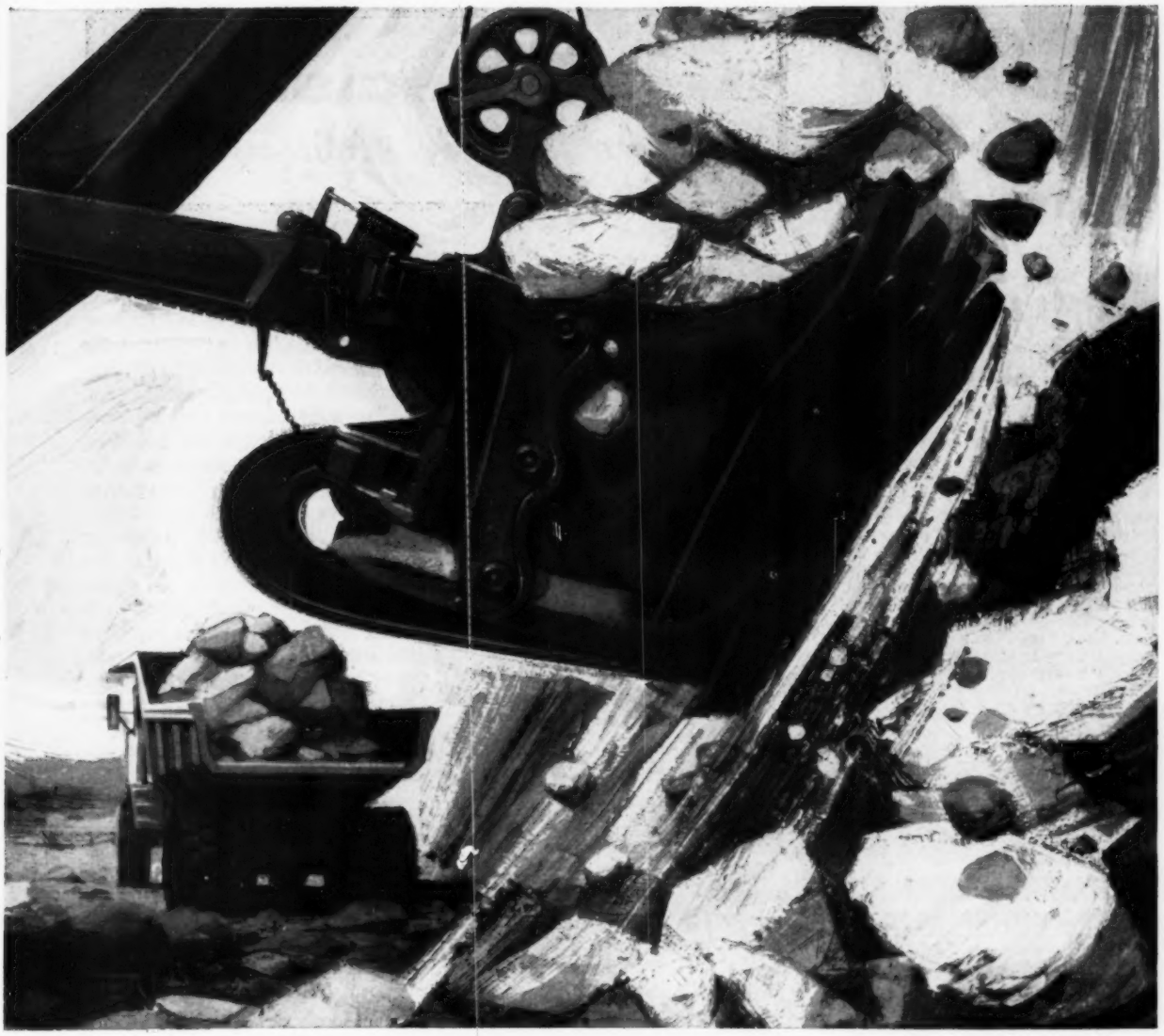
treat rock like dirt!



All-welded and stress-relieved — stamina, strength and guts to shrug off years of hard work! Tough, impact-loving Link-Belt Speeders thrive on the roughness of rock. They're built for rugged duty with all-welded, stress-relieved, jig-bored frame assemblies. Precision boring permits parts interchangeability, steps up machinery strength under stress. Extra-size, heat-treated machine components transmit more of rated hp to swing, hoist, travel, slam the dipper in. All-welded shovel-booms and dipper sticks . . . all-manganese buckets soak up strains without a shudder. Shafts, gears, bearings are precision aligned, stay aligned. No shims needed. Clutches are self-compensating for heat and normal lining wear.

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LINK-BELT SPEEDER

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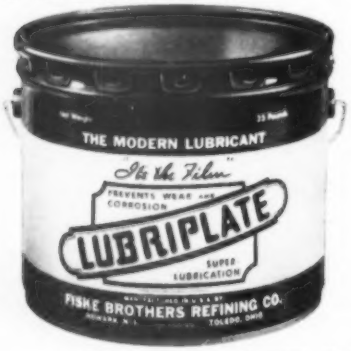

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

ANOTHER P&D EXCLUSIVE

DURING the last few weeks the writer made special efforts to list outstanding lawsuits likely to impart valuable legal information to assist buyers, sellers, producers, and manufacturers to avoid future legal expenses and save valuable time. I shall briefly review these important and interesting decisions.

Smoke Abatement Ordinance Is Valid

Last month a higher court rendered an unusually important decision which answers a legal question often in controversy and in the past generally not clearly decided by any higher court. This is the legal: "Is a city ordinance valid and enforceable which prohibits emission of smoke from a boat or vessel used to transport merchandise and materials in interstate commerce?"

For illustration, in *H. P. C. Company* v. *City of D.*, 93 N. W. (2d) 888, the testimony showed these facts:

A city passed a comprehensive ordinance which provides that it shall be unlawful within the city to permit the emission of smoke of a density equal to or greater than that described as No. 2 Ringlemann Chart (a standard accepted way of measuring the density of smoke). The ordinance also provides that after an owner has been warned of six violations within a 12-month period the city commissioner shall serve notice on the owner and seal the offending equipment unless he finds that adequate corrective steps have been taken. It also provides for the inspection of equipment and for fines and imprisonment for failure to comply with the ordinance.

The city filed complaints and a suit against the H. P. C. Company, owner of a steamship for allowing the emission of dense smoke at the port of the city, contrary to the provisions of the ordinance in question.

The legal counsel for the company contended that the city ordinance is void and unenforceable for only these reasons: (1) because the steamships are utilized to transport materials in interstate commerce, and the United States Congress has sole power to regulate interstate commerce; (2) because the ordinance is unconstitutional except in those instances where the objectionable smoke is caused by improper firing or by the improper use of the equipment on the vessel; (3) because the Congress of the United States has provided for extensive control and inspection of American vessels on the Great Lakes, and that by such legislation Congress has preempted the field and that therefore the ordinance in question is invalid; and (4) because the ordinance is unreasonable.

The higher court held the ordinance valid and enforceable saying:

"The constitutional grant to Congress of power to regulate interstate commerce, although operating of its own force to curtail state power in some measure, does not forestall all state action affecting interstate commerce and it does not withdraw from the states power to legislate in respect of their local concerns, even though such legislation may indirectly and incidentally affect interstate commerce."

With respect to the valid purpose of the ordinance, the court said:

"We think the ordinance before us is clearly aimed at the prevention of air pollution and not at any regulation of interstate commerce. Its purpose is simply to control to some extent the emission of unnecessary smoke in a community so as to protect the health and welfare of its inhabitants."

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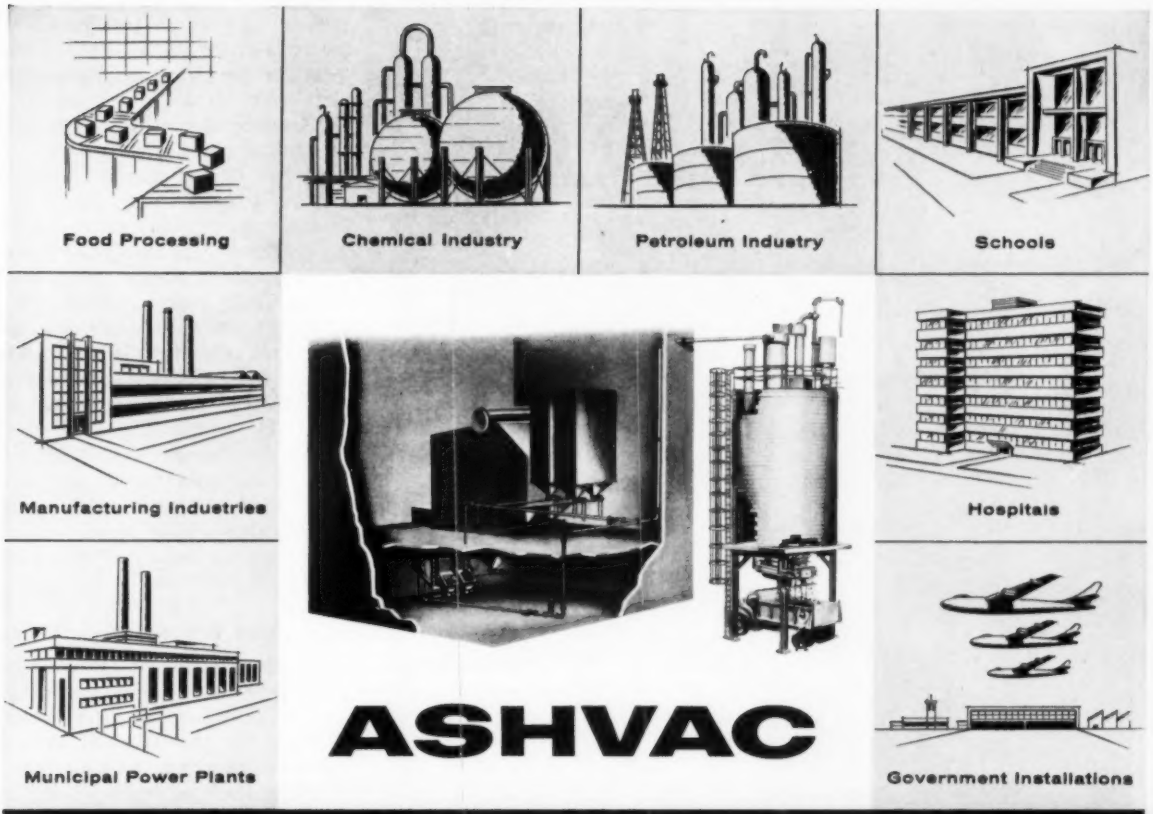

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ASHVAC is PROJECT ENGINEERED—There is no "package" system for all applications. Each job is different; ASHVAC uses standard components in a system engineered to the job's specific requirements.

ASHVAC is PRICED RIGHT—Years of experience have enabled us to standardize many components, reducing manufacturing costs. A-S-H operates its own manufacturing plant—another cost saving advantage passed on to our customers.

ASHVAC is BACKED BY EXPERIENCE—The Allen-Sherman-Hoff Company has pioneered in the solution of ash handling problems. Behind every job is 37 years of experience—giving you the best, cleanest and cheapest system to operate.

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All 3 types are insensitive to shock, abrasion and strong electrical currents. They can be detonated only with fuse and cap or electric blasting cap. AA-9574

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With relation to contentions of the counsel for the H. P. C. Company that the ordinance is unreasonable, the court said:

"An ordinance of this type may be said to be reasonable only if it does not unduly hamper industry and our continual need for power. If this ordinance sought to prevent the emission of all smoke, or if adequate means of smoke control were not available, then a different question might be before us. But this ordinance concededly seeks to outlaw only the emission of smoke of such density that can readily be prevented by the use of modern smoke control equipment. All it costs is money. We hold that the ordinance in question is a reasonable exercise of the local police power and as such does not unduly interfere with interstate commerce."

Deceased Without Dependents

A reader asked: "Can an industrial commission authorize payment of a deceased employee's compensation, under the State Workmen's Compensation Act, to an administrator if the late employee left no dependents?"

According to a late higher court decision, the answer is no.

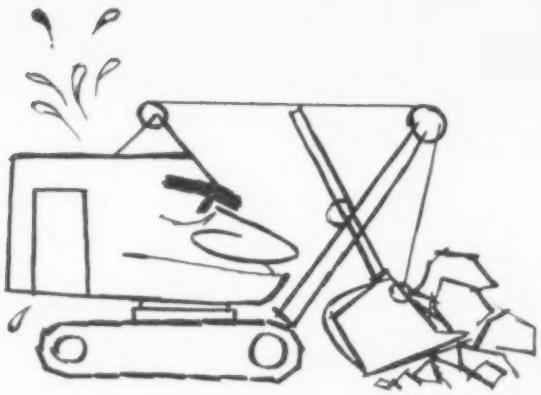
For example, in *Federal Cement Tile Company* v. *Pruitt,* 146 N. E. (2d) 557, it was shown that an employee of the Federal Cement Tile Company died without leaving a widow, children under age of eighteen, or any other dependents.

In subsequent litigation, the higher court held that the Industrial Board did not have authority to make an award to the decedent's administratrix.

Court Limits Restrictive Contract

A new higher court rendered an unusually important decision holding that irrespective of the contents of an employment contract an ex-employee will not be prohibited from taking competitive employment in territory he did not cover for his previous employer.

For example, in *Spinks* v. *Riebold,* 310 S. W. (2d) 668, the testimony showed these facts: A salesman, named Riebold, signed an employment contract in which he agreed that he would not, after termination of his present employment,



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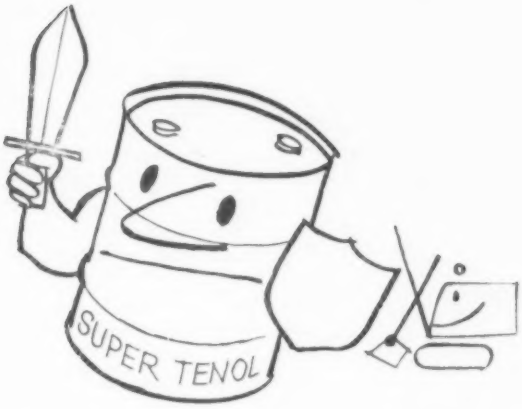

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directly or indirectly engage in the same or similar business within New Mexico, Texas, and Oklahoma for a period of five years after termination of his employment.

Sometime later Riebold terminated his employment voluntarily, and immediately began to engage in a business similar to that of his former employer in these states.

In subsequent litigation, the higher court held that irrespective of the contents of the restrictive employment contract, Riebold would not be prohibited from soliciting business in parts of these states in which he had not solicited business for his former employer.

Nevertheless, the higher court granted an injunction prohibiting Riebold from soliciting business in the towns and counties he had worked in for his former employer.

Must Follow Taxation Laws

A few weeks ago a higher court rendered a decision which clearly answers a legal question often raised by various motor truck operators. This question is: "Can the county in which our motor vehicles are stored or situated, on January 1, tax these trucks?"

The answer is: Not if the vehicles are only temporarily situated in this county.

For example, in *Chemical* v. *Roscoe*, 310 S. W. (2d) 694, the testimony showed that a company had its 26 motor vehicles in Nolan County on January 1, 1956. The company had its office and principal place of business in Dallas County. Nolan County assessed taxes against the 26 vehicles because a state law provides that all property, real and personal, shall be listed and assessed in the county where it is situated.

The higher court held that Nolan County could not collect taxes on the vehicles because another statement provides that all personal property shall be listed and assessed in the county of the residence of the owner, or in the county where the principal office of such owner is situated.

Hence, since the vehicles were only temporarily situated in Nolan County on January 1, the higher court held:

"The situs of such personal property for taxation was in Dallas County, where the defendant, the

owner, had his home offices and principal place of business."

Crusher Owner Has Possession Rights

Recently a reader asked: "If the holder of a mortgage on quarry property forecloses the mortgage, does he own all equipment on the land at the time of the foreclosure?"

According to a late higher court decision, the answer to this question is in the negative. This is so because the law is well established that no one, including a court, can sell, convey, deed, or otherwise transfer ownership in real property or chattels actually and lawfully owned by another person.

Another important rule of law is that mere possession of another man's property or chattel affords no evidence that the person having such possession has authority or power to sell it.

For example, in *Kelley* v. *Ness,* 189 Pac. (2d) 570, it was shown that the Meyers Concrete Products Company owned certain land and structures. One of the buildings housed certain machinery.

A creditor foreclosed his mortgage against the concrete company and thereby ostensibly became the owner of all the land and buildings and equipment thereon. A few weeks later the creditor sold the machinery to a man named Ness.

Later one Kelley sued Ness to get possession of the equipment and machinery. During the trial Kelley proved that the machinery belonged to him and that he had left it on the creditor's land for safekeeping.

In view of this evidence, the higher court held that Kelley could take possession of the machinery without paying Ness any money and said:

"Nothing can be plainer than that no one can sell a right when he himself has none to sell."

The same relative law is applicable to purchasers of mortgaged equipment if the testimony shows that the mortgage was recorded, or that the purchaser had knowledge that the equipment was mortgaged. Hence, circumstances very often arise causing an innocent purchaser of equipment to suffer financial loss.

For illustration, in the leading case of *Guerin* v. *Kirst,* 188 Pac. (2d) 509, the testimony showed that

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Anaconda SH-D Shovel Cable at work in an open-pit mine. Continual on-the-job testing of Anaconda designs under the roughest conditions enables us to produce extra long-life shovel cables that prevent power failures from heat, moisture, rugged terrain, kinks and runovers . . . all of this saves you money, assures continued and uninterrupted production.

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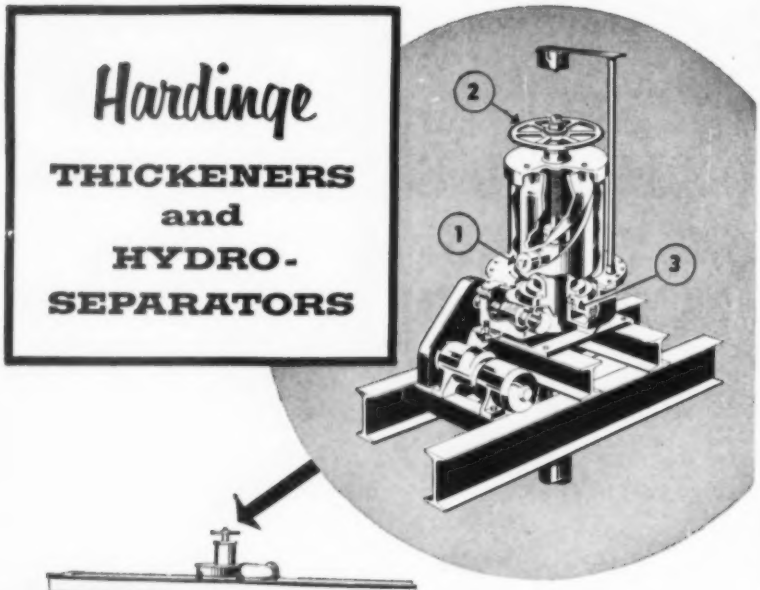
Hardinge

THICKENERS and HYDRO-SEPARATORS



. . . for all clarifying, thickening and de-sliming operations.

For flotation concentrates thickening ahead of filtering—or for tailings disposal or reclamation, Hardinge Thickeners provide:

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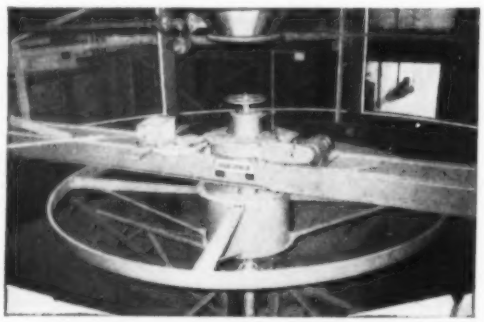
2. Manual or power raise to supplement "Auto-Raise."
3. Replaceable ring-type ball bearing support for rotating mechanism.
4. Spiral rakes for maximum underflow density.

Also available are froth rakes for froth-free over-flow and superposed type tank construction for minimum floor space and building economy. Complete specifications on request. Bulletin 31-E-8.



A 35'-diameter Hardinge Superposed Thickener installation in a Canadian lead-zinc concentrator. The sludge outlet for the upper unit can be seen at the top of the picture. Note froth ring on lower unit.

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one Guerin, engaged in the business of buying and selling quarry and concrete equipment, sold on credit to a man named Grove a used diesel tractor. The sale was evidenced by a recorded mortgage, written in longhand and signed by both parties. Guerin allowed Grove to take possession of the machine. Without permission or knowledge of Guerin, Grove sold the equipment to a man named Kirst, who had no knowledge that it was mortgaged. Later Guerin sued Kirst to get possession of the machine.

Kirst contended that he should be allowed to keep the machine in his possession because he was an innocent buyer and did not know that Grove owed money on the equipment.

Nevertheless, the higher court ordered Kirst to give up possession of the equipment to Guerin and said:

"Under such circumstances the conditional vendor is entitled to recover even though the subsequent purchaser had no knowledge of the reservation of title by the original vendor until payment in full."

Full Liability for Breach

The owner of a sand and gravel plant wrote of an unusually interesting situation: "Over a year ago I leased certain machinery and made a small down payment, agreeing to make further payments amounting to $600 on the first of each month for 6 months. I made the down and also paid $600 rental the first month. When I refused to pay any more monthly payments, the owner took the machinery from me. Now, he is suing me for $3,000, which he claims is due on rentals. Can he collect? I thought that when he took possession of the machinery my obligations were at an end."

According to a leading higher court, a lessee of machinery must make all agreed rental payments, or the lessor may immediately take possession of the machinery, and the lessee must pay all future monthly payments specified in the rental contract.

For example, in *Williams, Inc.* v. *Phillips,* 190 Pac. (2d) 189, the testimony showed the following facts: A company is the owner of a 1½-cu. yd. Lorain Model 77 shovel with a 45-ft. dragline boom, together with fairleads, and powered

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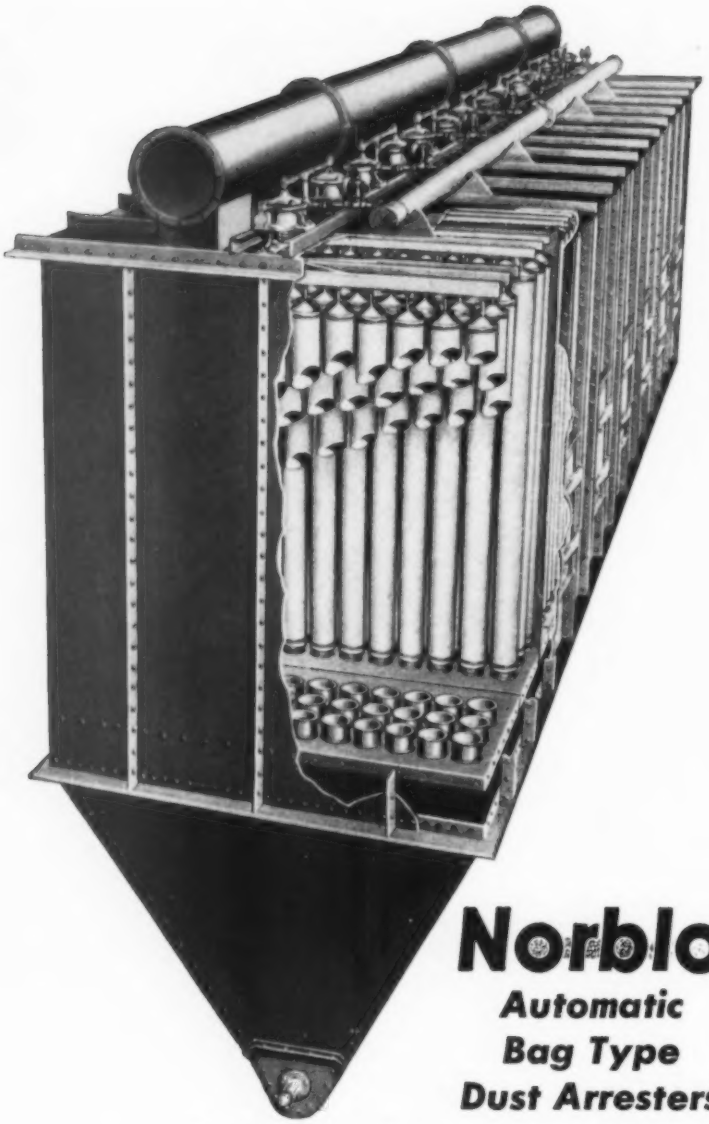

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by a Caterpillar engine. The company leased the shovel to one Phillips, by a written lease for 12 months.

The lease contract provided that if Phillips, the lessee, missed one payment the company, lessor, could repossess the shovel. The contract also stated that Phillips would pay $6,000 in advance and pay rentals amounting to $1,050 a month for 12 months. Phillips paid $6,000 in advance, and paid $1,050 a month for two months, and then missed the third month's payment.

The company filed suit against Phillips, and the higher court held that the company could take possession of the shovel at once, and that Phillips must pay the balance due on the lease contract of $1,050 per month for ten months, or $10,500.

Water Is An Attractive Nuisance

Considerable discussion has arisen from time to time over the legal question: Under what circumstances is a body of water an attractive nuisance which results in a property owner's being liable for the death of a child by drowning?

A few weeks ago a higher court answered this important legal question.

For instance, in *Bissaillon* v. *Kankakee,* 146 N. E. (2d) 381, the testimony showed that a small boy was drowned when he fell through ice covering a water-filled quarry.

The higher court held that the body of water constituted an attractive nuisance, rendering its owner liable for the death of the boy.

This higher court went on to explain that if real property has something dangerous on it, which is attractive to children, it is the legal duty of the owner to prevent children from coming onto the property. If a fence had been constructed around this water-filled quarry, its owner would have avoided the heavy damage allowance awarded by this court for the drowning of the boy.

Cannot Stop Motor Trucks

Some time ago I received an inquiry from an official of a cement corporation who wants to know whether or not a city can pass and enforce an ordinance which stops operation of the corporation's motor

(*Continued on page* 162)

BRADLEY HERCULES MILLS

HOW TO INCREASE CEMENT PRODUCTION UP TO 50%...

The capacity of an existing tube or compartment mill can be increased up to 50% or even higher simply by installing a Bradley Hercules Mill as a preliminary pulverizer on either the dry raw or finish side. Yet this increased production of cement raw material or finished cement is obtained at no increase in horsepower consumption per ton or barrel produced. The Hercules automatic electrical feed control eliminates manual operation. Rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum. That's why so many in the cement industry rely on the Hercules Mill for increased production of finished material.

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superior grinding equipment since 1891

Tandem trailer units, with a Mack LRX Model doing the hauling, keep the pressure on 3¼-yard electric shovel at the Maryland quarry of North American Cement Corporation.

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NO. 1
by far in sales of
diesel trucks

Maneuverability and ease of handling are Mack features which have made them favorites for heavy-duty quarry work. Here 28 tons of rock is unloaded at the crusher located a half-mile from quarry face.

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At the Security Plant of North American Cement Corporation...

TWO MACKS

handle half a million tons of rock per year

North American Cement Corporation has jumped hauling capacity and still kept down costs at its Security Plant in Hagerstown, Md., by coupling full trailers with LRX Model Macks. Each of the two rigs now handles 28 tons at a clip—together they will move 500,000 tons of limestone this year.

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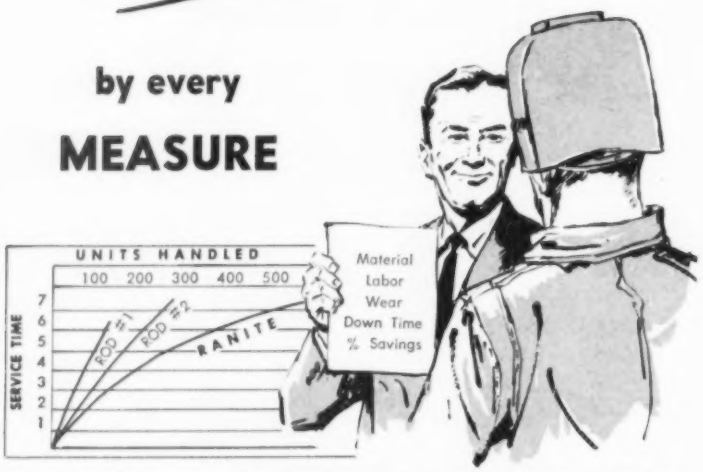

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(*Continued from page* 158)

trucks on the city streets. Recently I located a higher court decision, involving a quarry corporation, which answers this same question of law.

For illustration, in *W. Stone Company* v. *County,* 86 N. W. (2d) 475, the testimony showed the following facts: Certain quarry premises lie within the limits of two cities. The land was originally worked as a farm, and in 1910 the first quarrying was done in the area. Later, new homes and subdividsions were built around the quarry premises. Both cities in which the quarry is situated passed ordinances restricting the use of streets against heavy trucks. The result was that, by the enforcement of the ordinances by arrests of truck drivers, the quarry business was forced to close down.

In subsequent litigation, the higher court enjoined both cities from enacting and enforcing any and all laws which would deprive the quarry owners and their customers of the ordinary use of the public streets going to and from the quarry premises along a specified route and within specified hours.

Must Illuminate Stalled Truck

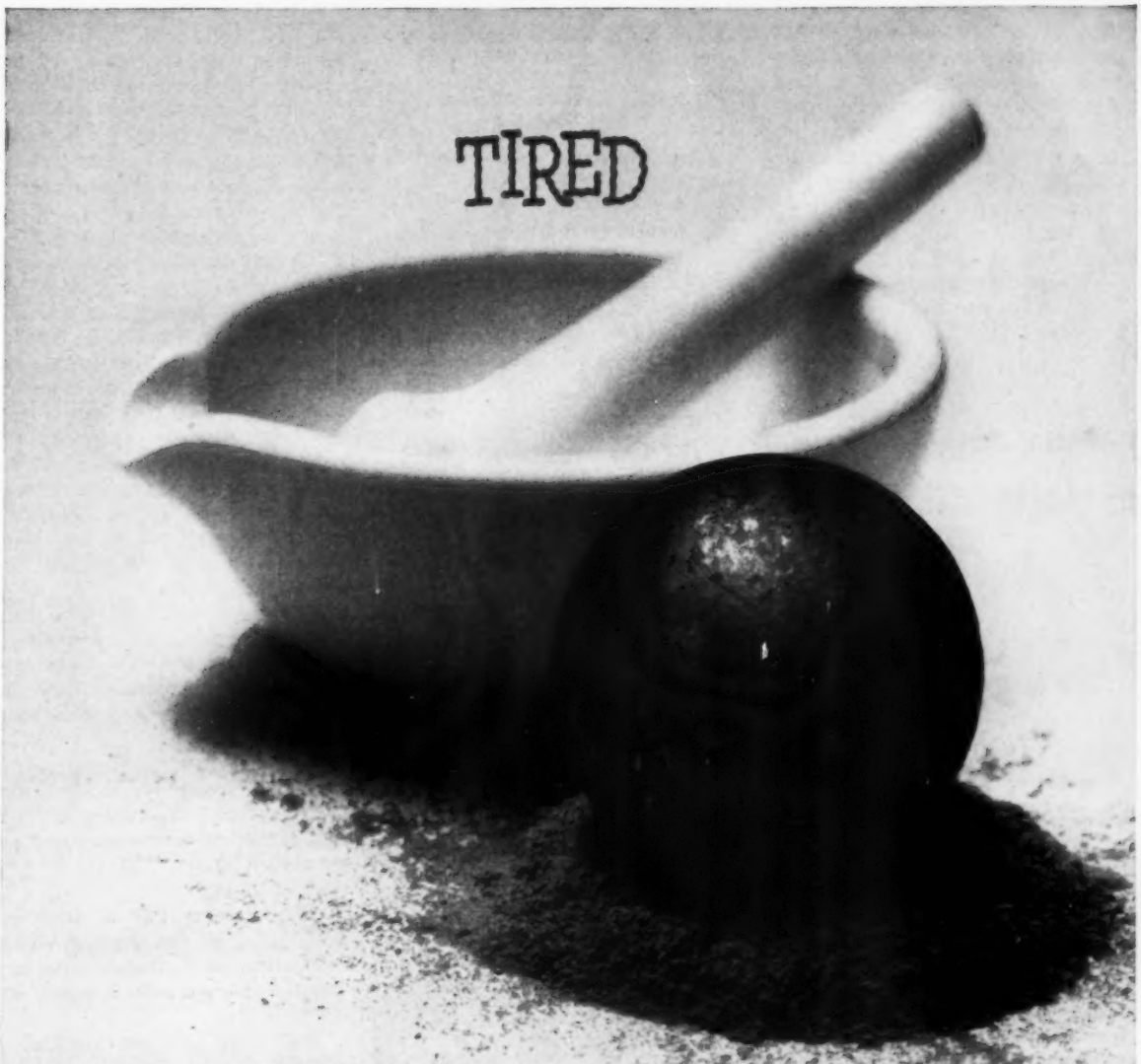
A few weeks ago a higher court held the owner of a motor truck liable in $25,000 damages to an automobile driver who suffered a broken left knee cap and three broken ribs, when her automobile collided with a motor truck which had stalled on the highway.

For illustration, in *Fox* v. *Hayes,* 244 Fed. Rep. (2d) 305, it was shown that a motor truck loaded with concrete blocks had stalled on the highway. This was at night, and an automobile driven by one Fox collided with the stalled truck.

The higher court held the owner of the truck liable in damages to Fox, although the testimony showed that the driver of the stalled truck had lighted a 20-minute red fusee and placed it approximately 1,500 ft. to the rear of the truck. The court said:

"True, a red light is a danger signal, but it is a signal which usually points out the place of danger. In this case the place of danger was 1,500 ft. east of the truck."

Hence, according to this late higher court decision a truck owner has no protection against damage



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suits in cases of this kind, unless the testimony proves that a red light, flare or fusee was placed in close proximity to the stalled motor truck.

Also, the higher court refused to agree with the argument that the damages of $25,000 awarded Fox are excessive, for a broken left knee cap and three broken ribs. The court said:

"It may be admitted that the award by the jury was generous, but we cannot say that there was any abuse of the trial court's discretion and, in our judgment, the award was not 'grossly excessive'."

When Anti-Trust Laws Are Violated

Considerable discussion has arisen from time to time over the legal question: When and under what circumstances may a seller of non-metallic products be held liable for heavy damages for violating the anti-trust laws?

A review of late and leading higher court decisions discloses that anti-trust legislation is concerned primarily with the health of the competitive process, not with the individual competitor who must sink or swim in competitive enterprise. But as a necessary incident thereto, it is concerned with predatory price-cutting which has the effect of eliminating or crippling a competitor. For, surely there is no more effective means of lessening competition or creating monopolies than the debilitation of a competitor.

With respect to these points, see *Busch* v. *Federal Trade Commission,* 265 F. (2d) 677. In this case the court was presented with the basic question whether uniform local cuts by an interstate manufacturer which disrupted the market to the injury of local competitors were price discriminations within the proscription.

The higher court held that even though directed at local competitors, the price cuts were not discriminatory, apparently because they did not discriminate among local competitors.

In another case officials of a corporation incorrectly decided that their acts of price-cutting did not violate the anti-trust laws. See *Nash* v. *United States,* 229 U. S. 373. This court said:

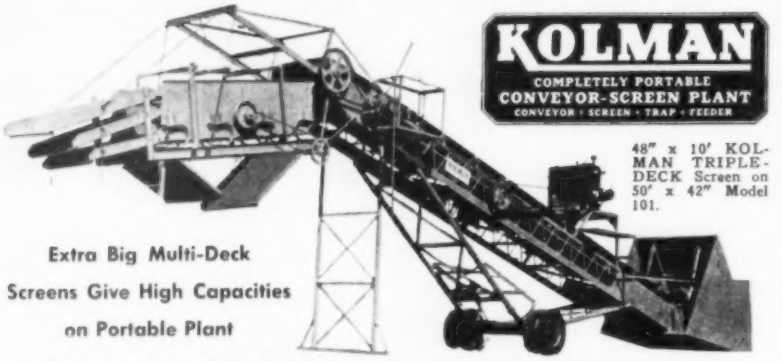
"The law is full of instances where a man's fate depends on his estimating rightly, that is, as the jury subsequently estimates it, some matter of degree."

And again, in *Corn Company* v. *Federal Trade Commission,* 324 U. S. 726, the Supreme Court of the United States, in a few words, construed the anti-trust laws to mean that their purpose is to prevent price discriminations which tend to injure competitive enterprise. To that end, it forbids a seller from charging different customers different prices for the same products, with the effect of lessening competition.

In other words, if price-cutting does not tend to lessen competition, there is no violation of the anti-trust laws.

ERNEST EARON, 51, superintendent of Gypsum Lime and Alabastine, Canada, Limited, Toronto, Ont., died in hospital in Toronto last December.

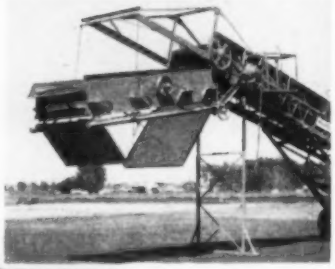
KOLMAN MODEL 101 PROVES VERSATILE AS AGGREGATE PRODUCTION UNIT



48" x 10' KOLMAN TRIPLE-DECK Screen on 50' x 42" Model 101.

Extra Big Multi-Deck Screens Give High Capacities on Portable Plant

With a choice of single, double, or triple deck screens on the KOLMAN Model 101 Portable Conveyor-Screen Plant, a variety of operations in the production of aggregate can be performed easily and economically. Making specification material, prescreening ahead of crushers, scalping and rejection, classifying, washings, blending, or simply high-speed loading—all are efficiently accomplished with this rugged, low cost plant.



Above, 5' x 12' double-deck screen on Kolman 101.

Left, two 5' x 12' single-deck Kolman screens were mounted on 60' x 42" 101 conveyors to produce over 2,000 t.p.h. of minus 1½" base course gravel.

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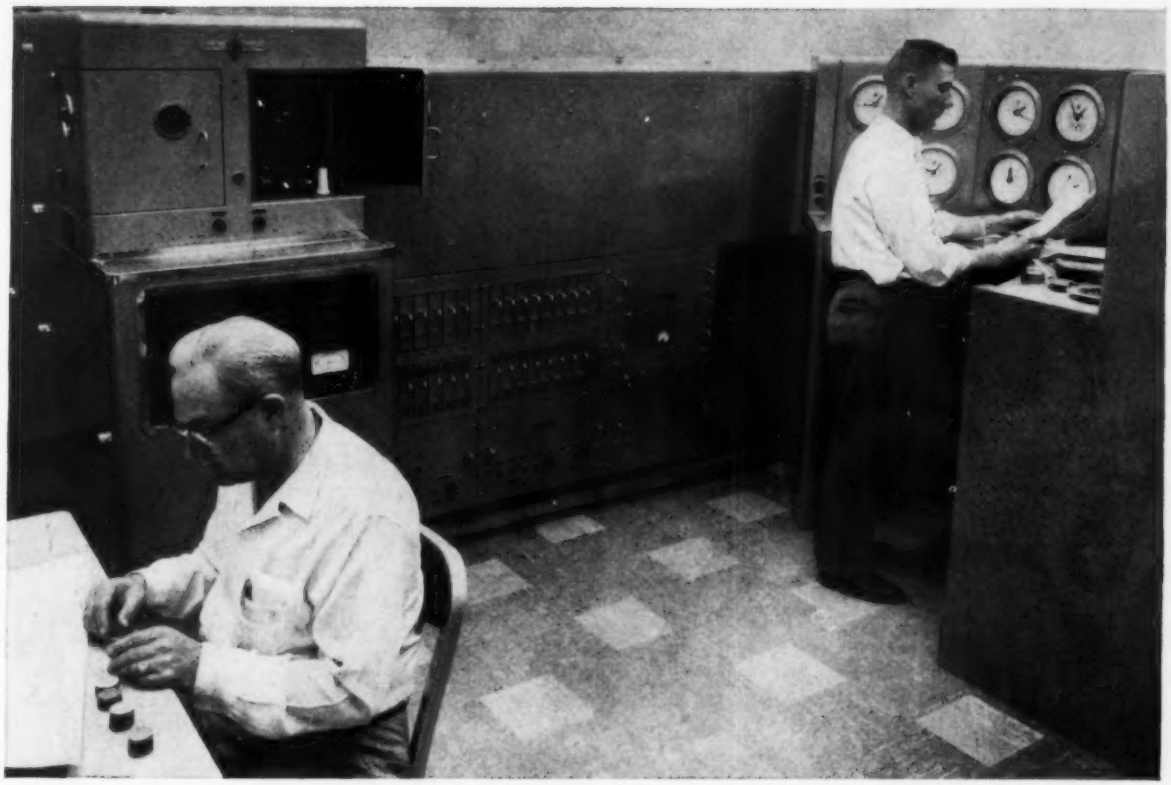

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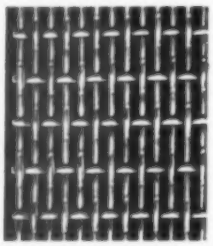
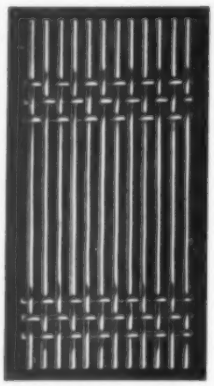


For maximum through capacity, CF&I Space Screens with rectangular openings are recommended. The high percentage of open area provides considerable freedom from blinding or clogging.



For maximum freedom from blinding or clogging, CF&I Long Slot Space Screens are the most efficient construction. Because of the open area and intense vibration of wires on the long sides of the openings, material can not cling or build up.

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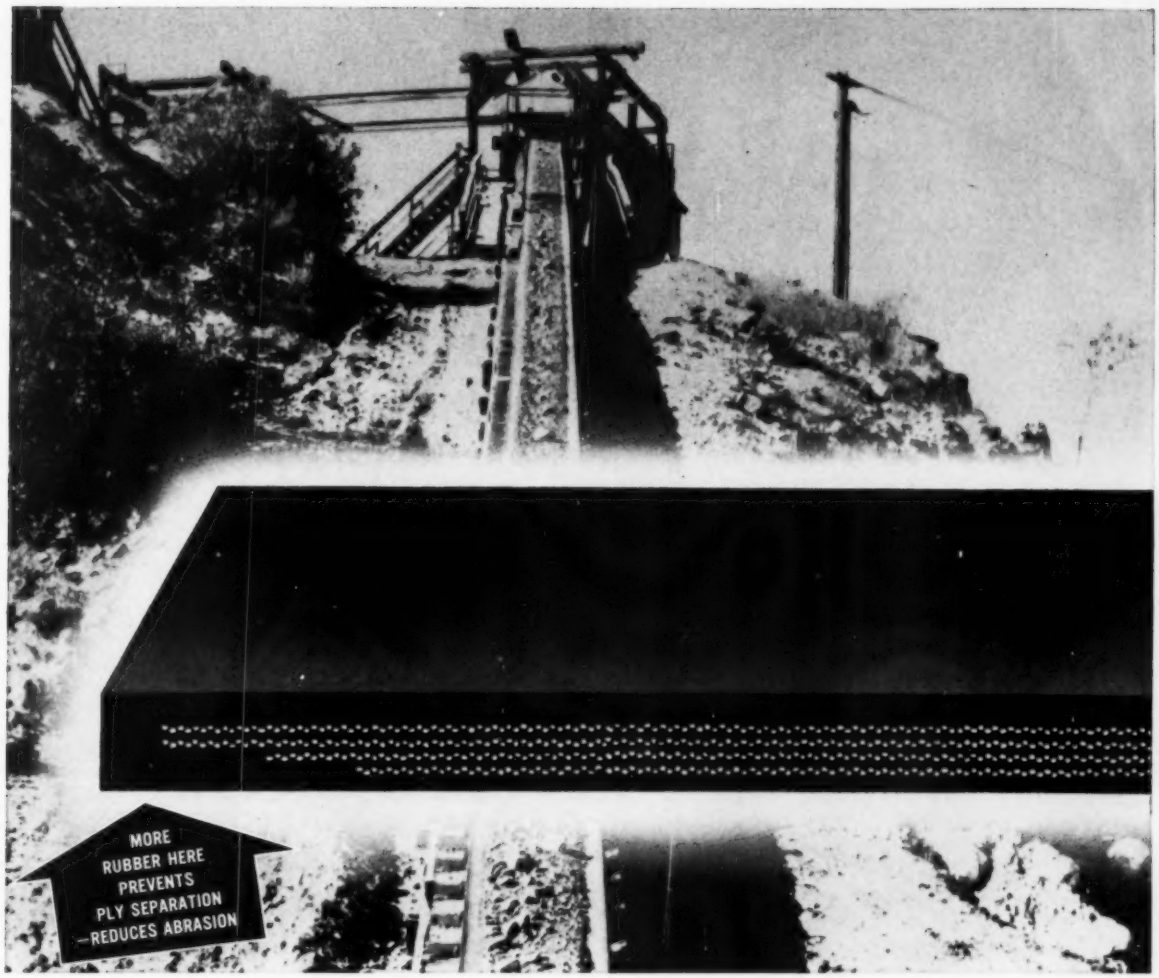

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*Patent Applied For

THERMOID DIVISION PORTER H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION, PEERLESS ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S.A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

ROUGH ROCK WORK: American 700 Series Shovel

Only American Gives You This Exclusive Line

ON CRAWLERS—ON RUBBER—ON RAIL

Whatever your demands, American Off-Track . . . On-Track Cranes assure you of top production

Here is American dependability at its best . . . boosting production on any pit and quarry operation.

You can always count on the full line of American Crawlers, Truck and Self-propelled Cranes on the ground—Locomotive Cranes on rail—to give you maximum effort in every type of work. Serving industry for over three-quarters of a century, American equipment is now better than ever . . . better than any. Write us for complete detailed and illustrated catalog information.

VERSATILE DUTIES: American DiesELectric® Crane

LOADING HOPPER: American 300 Series Truck Crane

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

EXCAVATORS-CRANES to 2 yds.-60 tons
LOCOMOTIVE CRANES to 130 tons

DERRICKS-HOISTS to 800 tons
REVOLVER CRANES to 400 tons

Enter 168 on card, page 173

UNION

The *UNIQUE Wire Rope Organization

**Single in Kind or Excellence*

Customers can be credited for Union's outstanding position.

Why? Simply because in large numbers they accepted Union's standing invitation to share their wire rope and sling problems with Union's technical, research and engineering staff.

In meeting these challenges, Union has compiled an outstanding record in wire rope advancements. Some 1600 standard wire rope constructions are in day-to-day production under statistical quality controls which insure "the ultimate low cost rope." This means quality so good that it costs less in the long run.

In searching for better answers to wire rope and sling problems for customers, Union engineers developed the famous family of Tuffy wire ropes and slings.

Each member of the Tuffy family is of a special construction tailored to one of the tougher wire rope jobs. In the Tuffy constructions there is balance—the right combination of strength, flexibility and resistance to wear for better performance and greater safety. When you say Tuffy, you specify the "Ultimate low cost" wire rope or sling.

Tuffy® Wire Ropes and Slings

Tuffy Balanced Dragline Rope

Tuffy Balanced Scraper Rope

Tuffy Balanced Dozer Rope

Big Paul, The King of Spades, world's largest electric power shovel. In taking a 105 ton bite (2 rail carloads) it imposes a maximum bail pull upon the wire ropes of 550,000 lbs. One-half mile of wire rope is required in its operation by the Peabody Coal Company at its modern River King Mine, Freeburg, Ill.

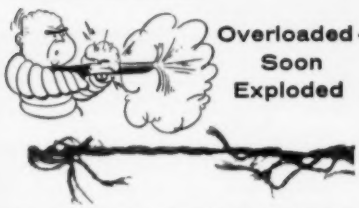
Look Up Your Union Distributor In Phone Book Yellow Pages

He's selected for his ability and willingness to supply you with the right Union standard or Tuffy wire rope construction, to check for proper installation and coach your operators in proper use to get the ultimate in service life. He is backed up by a nearby Union branch office and warehouse. If you would like to receive Union's Rope Dope Educational Bulletin, write Union Wire Rope Corporation, 2132 Manchester Ave., Kansas City 26, Mo.

Tuffy Wire Rope Tips on Safe Use of Wire Rope and Slings

On the Blink from a Kink

Mishandling of rope caused this open kink. Avoid kinks by proper winding on the drum. Never pull a loop smaller. Enlarge it, then straighten out the rope.



Overloaded - Soon Exploded

The rated capacity of a wire rope is based on breaking strength divided by the load factor for particular type of service. Grade of steel, type of construction and size of rope determine tensile strength. Unless rope is properly related to loads, costly and dangerous early failures are likely to occur.

Mangled in a Wedge Socket

Here's a result of improper socketing, caused by poorly designed or worn-out wedge socket. Can be costly and hazardous!

Victim of the "Bends"

Excessive bending of rope speeds up wear. General rule: use more flexible ropes as bending stresses increase (with decrease in tread diameter of sheave or drum). If sheaves are too small, early rope failure is certain.

Would you like a copy of a booklet in which more than a score of Tuffy Tips like those above are reproduced. If so, write Union Wire Rope Corporation, 2132 Manchester Ave., Kansas City 26, Missouri.

Tuffy Balanced Slings and Hoistlines

1-C

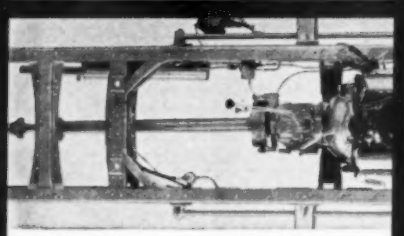
UNION Wire Rope

Subsidiary of ARMCO STEEL CORPORATION

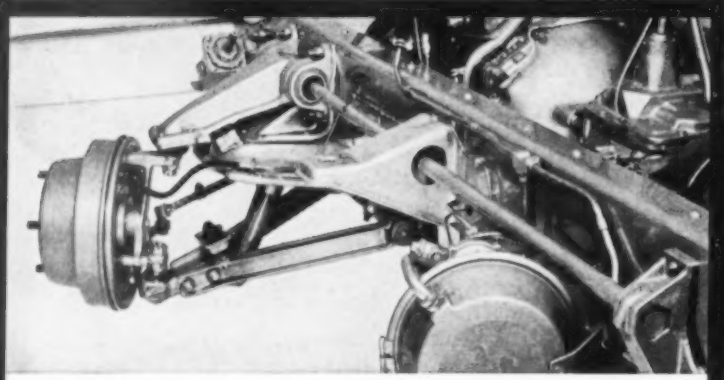
OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company
Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Southwest Steel Prpducts

Chevy's major components for 1960 last up to four times longer than ordinary truck parts—exhaustive testing has proved it. Likewise, the totally new cabs have proved 67% more resistant to twisting; and new frames for many models are as much as 4.8 times stronger in torsional rigidity. These are typical 1960 Chevrolet truck facts and figures—and they point up a new kind of tough truck build that helps you hang on to your dollars!

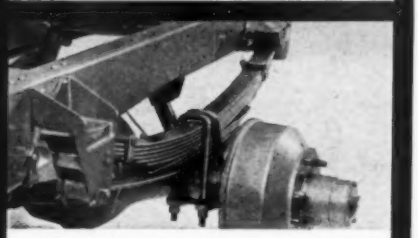
Chevy's precision-balanced wheels run smoother. Balancing weight shows that all front wheels are balanced in assembly—an advantage no other truck offers. It's assurance of easy handling; that tires will last longer without shimmy and shake from wheel imbalance.



Chevy's new frames are built with new brawn. Box-section rail design is stronger than ever; rail section modulus has been increased as much as 57%. Massive "K" or "X" brace crossmembers add to truck stamina; help keep you going years longer at least expense.



Chevy's new torsion-bar independent front suspension saves maintenance, increases work output. Independently suspended front wheels step right over bumps; tough torsion bar springs soak up shocks. As much as 58% of all objectionable road shock is absorbed before it reaches truck body, sheet metal or driver!



Chevy's easier riding rear springs help roll up profits. New variable-rate rear springs come in high capacities to handle huge payloads. Spring resistance adjusts automatically to cushion the load better.

CHEVROLET'S BIG NEW BUILD IS LIKE MONEY IN THE BANK FOR YOU!

Here are just a few of the *many* ways in which Chevrolet's totally new build for '60 will work to build a bigger bank account for you. They show that a '60 Chevy means *profit* through longer life, less maintenance, easier working, outsized cargoes and extra economy! You'll find, too, that 1960's savingest truck *power* is Chevrolet's: famous economy 6's and efficient short-stroke V8's for light-duty models . . . high-power, high-torque V8's and tough, dependable 6's for the bigger trucks. It'll profit you to see your Chevrolet dealer about Chevy's big new build, sometime soon. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

WET & DRY BULB THERMAL SYSTEMS & ACCESSORIES are described in a 4-page bulletin, Specification S 690-3, released by Minneapolis-Honeywell Regulator Company. All wet and dry bulb thermal components—bulbs, tubing, and accessories—which are used with Brown filled-system thermometer-psychrometers. Also included are water supply accessories for wet bulbs—wick and tank, or porous tube—and suction fans which assure ample flow of air across the wet bulb surface. The sheet also lists the recorders and the electric and pneumatic control models available for relative humidity. **(301)**

A GUIDE TO DESIGNING LOW COST AIR SUPPLY SYSTEMS for blowing off chips, dust and other particles from machine surfaces is now available without charge from the U. S. Hoffman Machinery Corp.

The design guide includes information on the relative performance of pressure systems and shows how a more effective blowing job can be accomplished with much less power input. Through the use of low pressure air in the 1.5 psig range and a separate centrifugal blower, power is saved and the main air system relieved of the blowing load making air available for tools and other devices. **(302)**

THE LINE OF ROLLER CHAIN AND TAPER-LOCK SPROCKETS offered by Dodge Manufacturing Corporation, is presented in a 56-page bulletin, A691. The expanded line of roller chain requirements and components includes single strand, double strand, single strand heavy series, double pitch drive, double pitch conveyor, double pitch conveyor with large rollers, and standard attachments.

Photographs and diagrams show construction details of Taper-Lock Sprockets for mounting on shafts. Steel plate and bored-to-size sprockets are also listed together with weld-on hubs and Taper-Lock bushings for special requirements. A section is devoted to Taper-Lock Chain Couplings.

Complete with selection data and list prices, the bulletin also includes general information on the installation of roller chain drives, calculation of center distances, horsepower ratings, conveyor engineering, and instructions for lubrication and maintenance. **(303)**

SCANDURA CONVEYOR BELTING for General Heavy Duty Service is a booklet describing their products' uses for the mining field by listing specifications, photographs, and characteristics. Particularly stressed is the fire resistance, light weight, and long life of the belting manufactured by Scandinavia Belting Company. **(304)**

USES AND CHARACTERISTICS OF CYNAMID FLOCCULANTS as used in mining are covered in a 20-page brochure prepared by American Cynamid Company. Descriptions of the various types, requirements for use, and applications are explained, and further clarified by the use of pictures and graphs. **(305)**

"FREEDOM FROM DUST," 28-page brochure, published by Dracco Division of Fuller Company, describes the range of dry collection equipment the company offers. Shown are ways of using cloth filtration and cyclonic equipment for eliminating dust control and air pollution problems in the industry. Featured are descriptive information and specifications on the Multi-Bag Filter, Uni-Filter, Glass-Bag Filter, and Whirl-Clone. Also described are special collectors and accessories. Illustrated application data shows how this equipment is used to collect waste dust or to return valuable, reusable material to the manufacturing process.

Bulletin No. 805 is available by request. **(306)**

ROTARY-GUN DRILLING, which combines both rotative and precussive force, is explained in an 8-page booklet by Stardrill-Keystone Company, a division of Kochring Company. According to the manufacturer, the equipment drills three to ten times faster than other methods, and the bits can be reground easily. All-purpose equipment, a blast hole type machine, and a machine primarily for well drillers are described and illustrated, with

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MARCH ***PIT AND QUARRY*** ***1960***

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS.

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____

We Produce_____

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PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—POSTAGE WILL BE PAID BY—

Pit and Quarry Publications
431 South Dearborn Street
CHICAGO 5, ILL., U.S.A.

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

specifications given for all three types of machine. Accessory equipment is also described. **(307)**

ANALYSES SERVICES AND QUALITY CONTROL for ores and minerals, clays, ceramics, and a wide range of items are being offered by the Spectrochemical Laboratories, of Pittsburgh, Pa. The company has available, on request, a brochure describing, with text and pictures, in sequence, the various steps taken to analyze the samples sent in, from the time they arrive, until the analysis is sent to the client. Included in the description are the sample preparation laboratory, the spectrographic laboratory, the wet chemical laboratory, the autrometer laboratory, and the quantometer laboratory. **(308)**

THE FOSTER WHEELER TYPE MB PULVERIZER 4-page folder gives diagrams, lists specifications, and provides photographs to describe the type MB mill. The pulverizer, a planetary roll and table pulverizer for coal, limestone, gypsum, and other industrial materials, reportedly has low power consumption, low maintenance costs, and uniform product fineness. **(309)**

CONTROL DUST IN STONE PROCESSING PLANTS, Deynor Data #68, is a data sheet, with a blue print type diagram on one side and a description on the other side of Deynor Corporation's dust control system for processing plants. The system, adaptable to large or small plants, consists of a Wet Water Mixer (automatic proportioner), some valves, spray nozzles, 1-in. piping, and a supply of Veriwet "wet water" Cartridges. The system reportedly gives complete dust control at a cost of less than one cent a ton of stone produced. The data sheet will be mailed upon request. **(310)**

UNIVERSAL ENGINEERING COMPANY has available a one-sheet bulletin, 539-A, outlining the production capacity of Universal's Gravel King, which combines crushing, screening, and loading in a single unit to give 700 t.p.h. **(311)**

"FORD TRACTORS, EQUIPMENT FOR GROUND MAINTENANCE"— Eighteen action photos in this 4-color, 8-page booklet show versatility of Ford tractors and equipment for roadside and park mowing and mulching, street and parking lot cleaning and snow removal, landscaping, and other grounds maintenance jobs. Free booklet is available from Industrial Sales Department, Tractor and Implement Division, Ford Motor Company, 2500 E. Maple, Birmingham, Mich. **(312)**

"EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW" is the title of the booklet produced by Gardner-Denver Company when this firm was honored by the Newcomen Society in North America. The booklet gives the company's 100-year history from its start as a one-room machine shop, to its present complex organization. As with all Newcomen booklets, the accent is on the company's use of the steam engine. However, mergers, and contributions of various individuals and companies, are given, as well as a description of the sales opportunities of the companies at their various stages of development. **(313)**

FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

—POSTAGE WILL BE PAID BY—

Pit and Quarry Publications
431 South Dearborn Street
CHICAGO 5, ILL., U.S.A.

NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

____One Year $3* ____Two Years $5 ____Three Years $6

____Payment enclosed ____Bill me ____Bill company

Name_____Title_____

Company_____

Address_____

City_____Zone_____State_____

Type of business
and products _____

*U. S., U. S. Possessions, and Canada only.
Pan American countries, $10 a year; elsewhere, $15 a year.

If any of the

TECHNICAL LITERATURE

offered here

will solve problems for you,

simply fill in the card

on this page, and note

the number of the item.

Always use tape to fasten the electric blasting cap (or fuse and cap) onto Primacord trunkline about six inches from end with the business end of the cap pointing in the direction of the blast.

FIVE PRIMACORD® CONNECTIONS

all tied for better blasting

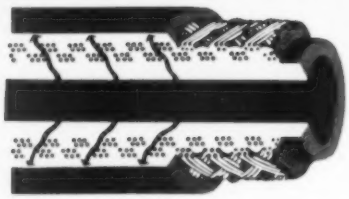
Primacord is easy to use. Positive priming can be accomplished with simple connections, proved and recommended for the type and size of cartridge or "powder" in use. These can all be made at the hole. For positive hook-up, the downlines can be connected to the trunklines with simple half hitches drawn up *tight*.

1. **LOOP-LOCK HALF HITCH** is recommended when the downline cannot be tied easily. The loop-lock makes it impossible for the half hitch to slip off the end of the downline. Shown is Plastic Wire-Countered downline and Plain Primacord trunkline.
2. **DOUBLE HALF HITCH** is recommended when the downline is Reinforced (shown), Plain, or Lo-Temp Primacord. It grips the trunkline, which in this case is Plain Primacord.
3. **SINGLE HALF HITCH IN TRUNKLINE** can be used when the downline is Plastic Reinforced (shown) or Plastic Wire-Countered. Place connection *at least a foot* from the end of the downline. Trunkline can be Plain (shown), Reinforced or Lo-Temp Primacord.
4. **PLASTIC CONNECTOR** is recommended when both downline (Plastic Wire-Countered) and trunkline (Plastic Reinforced) is of a type that does not tie securely.
5. **SQUARE KNOT** is recommended for trunkline connections when using Plain, Reinforced and Lo-Temp Primacord (shown).

Priming and hooking up with Primacord simplifies field work, reduces hazard, promotes economy and can give you the results you plan for. P-1

The **ENSIGN-BICKFORD COMPANY**

SIMSBURY, CONNECTICUT *Since 1836*



"MORE USE PER DOLLAR"

Rubber tie-gum penetrates Homoflex braided plies to provide an inseparable tube-to-cover bond. More flexible and lighter weight than any hose for equal pressure.

R/M HOMOFLEX HOSE HANDLES EASIER...LASTS LONGER

Homoflex Air Hose is mandrel-made with *no* pre-set twist—it coils and uncoils freely in *any* direction *without* kinking! It's the easiest handling hose you can use with air drills. Exclusive Homoflex construction makes strength member and tube virtually inseparable, assures long, trouble-free service life. Uniform inside and outside diameters permit faster, easier, *safer* coupling . . . faster, fuller flow.

Strong, light weight, and "flexible as a rope", Homoflex Air Hose adds up to real labor and cost savings on the toughest jobs. Homoflex H.D. Air Hose is also available for extra heavy duty and *with yellow cover stripe* for visibility; also in type for water in mine use.

- **SUPER STRONG**
- **PRECISION BUILT**
- **LIGHT WEIGHT**
- **FLEXIBLE AS A ROPE**

Write for Bulletins M610 and M694.

RM-1017

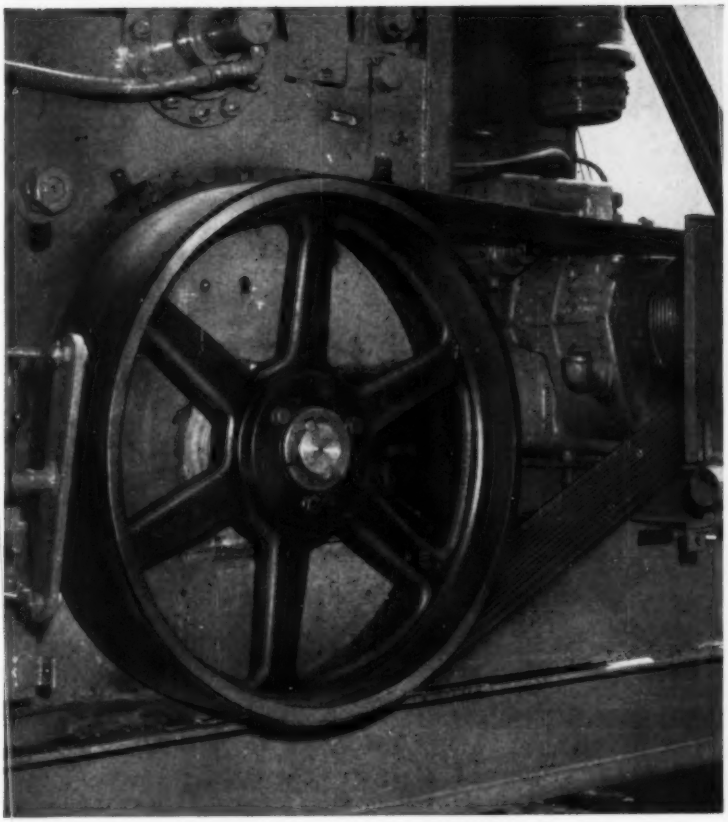
RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM

ENGINEERED RUBBER PRODUCTS ..."MORE USE PER DOLLAR"

RAY-MAN CONVEYOR BELT *Engineered for 45° Idlers*

You can now get up to 60% greater hauling capacity—save up to 20% on conveyor costs—as compared to using regular 20° idlers. Ordinary ply belts are too stiff and boardy to do the job—Ray-Man's exclusive flexible construction and built-in stress compensation is *guaranteed* to take the sharp angle of 45° idlers *without* ply or cover separation at the hinge line. Learn how Ray-Man Conveyor Belt opens up a whole new era of conveyor design . . . permitting larger loads . . . narrower conveyors —assuring longer cover wear, lower handling costs! Write for Bulletin M303.



CONVERT TO R/M POLY-V® DRIVE FOR MORE POWER IN LESS SPACE... *with Reliability*

- SINGLE UNIT V-RIBBED DESIGN
- ELIMINATES BELT "MATCHING" PROBLEMS
- MAINTAINS GROOVE SHAPE
- CONSTANT PITCH AND SPEED RATIOS
- LESS WEAR ON BELT AND SHEAVES
- COMPLETE CONTACT-PRESSURE

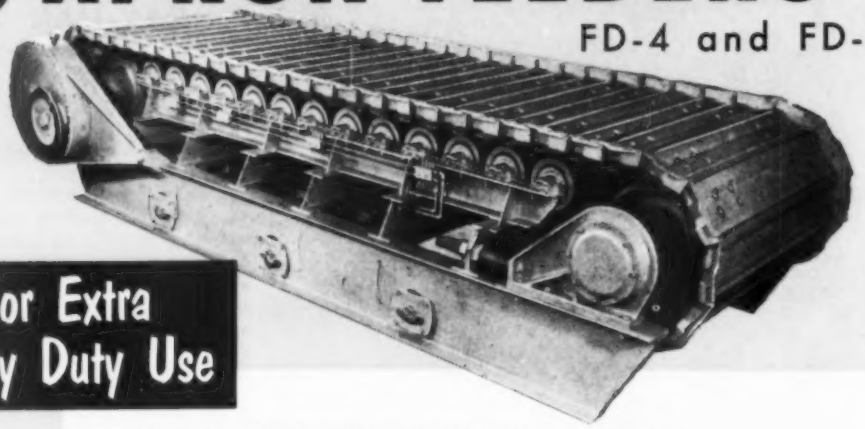
Just two Poly-V belt cross sections meet every heavy duty power transmission requirement.

R/M Poly-V* Drive is the smoothest and coolest running —*longest wearing* drive you can install. Discuss your application with an R/M Distributor . . . or write for Poly-V* Drive Bulletin M141.

**Poly-V is patented by Raybestos-Manhattan, Inc.*

NICO APRON FEEDERS

FD-4 and FD-8



For Extra Heavy Duty Use

- Uses Mass Produced Standard Crawler Tractor Parts
- Short Pitch, 8" on FD-8, 6-¾" on FD-4, provides more even feed
- Decks of Cast Manganese or Formed Alloy Steel
- Larger Diameter Head and Tail Shafts
- Anti-Friction Self-Aligning Bearings
- Centralized Lubrication Available
- Uses NICO Shaft Mounted Reducer . . .
  Eliminates open gearing and lubrication problems

Write for Illustrated Brochures

NATIONAL IRON COMPANY
SUBSIDIARY OF PETTIBONE MULLIKEN CORP., CHICAGO 51, ILLINOIS

50th Avenue West and Ramsey Street
Duluth 7, Minnesota

Enter 178-A on card, page 173

WEAR CAN BE DANGEROUS!

Warns Miss Southern Tire

A stitch in time is important, but a retread in time can save a lot more money. Why risk costly downtime with "Do it yourself" tire maintenance? Let Southern Tire experts provide on-site inspection, pick-up and delivery of your giant tires.

Southern Tire's superior equipment and experience in the giant tire retreading field assure you *more* UPTIME, with a WIDER MARGIN of SAFETY at MINIMUM COSTS.

Southern Tire Retreading provides a wide selection of tread designs and sizes, too.

Rock Service • Traction Types
Rib Treads from 1100 x 24 to 33.5 x 33.

AVOID GUESS WORK
CHOOSE AN EXPERT
CALL SOUTHERN TIRE

SOUTHERN TIRE COMPANY
1414 Broadway
SHEFFIELD, ALA.
Phone Collect
EV 3-2312

Enter 178-B on card, page 173

This Pipe is EXTRA Strong . . . EXTRA Safe . . . It's NAYLOR

NAYLOR Spiralweld pipe provides the practical way to get the economy of light weight without sacrifice of strength in your pipe lines.

Because of its exclusive lockseamed-spiralwelded structure, this distinctive pipe provides greater strength plus extra safety against shock loads, stresses and strains. And you get these advantages along with the light weight that saves time, work and money on handling and installation.

For air, water and ventilating lines, it will pay you to get the facts on NAYLOR pipe as well as on NAYLOR Wedgelock couplings. Just write for Bulletin No. 59.

The NAYLOR Wedgelock coupling makes a positive connection, securely anchored in standard weight grooved ends. A hammer is the only tool needed to connect or disconnect it.

NAYLOR PIPE *Company*

1257 East 92nd Street, Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 60 East 42nd Street, New York 17, N. Y.

How granite-bucking TD-20 wins tough quarry job!

—for Superior Stone Company, Crabtree Creek Quarry, Raleigh, North Carolina

Main reason why it's a TD-20 instead of some competitive rig: the more powerful, stronger-built "20" replaces a past model International TD-18—that set a stand-out record of high availability and low upkeep at this quarry!

The "20" is key equipment in helping feed the 200-ton-per-hour capacity crushing plant at Crabtree Creek Quarry of Superior Stone Company (Division of American Marietta Company).

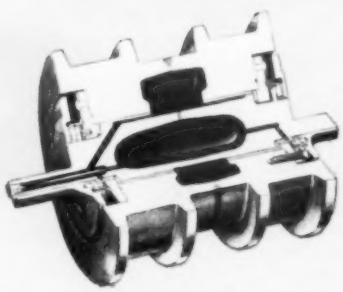
Slamming hard, heavy granite stone around is a main item on this International TD-20's work diet. That and tough over-burden removal, and haul-road maintenance!

"Rock-Bossing" power and strength

The TD-20's engine is a high-torque 134-hp diesel—with 6-cylinder smoothness and International diesel starting ease and economy. Bridge-strong track frames of heavy-duty, gusset-braced, welded box sections form the TD-20's rock-shock-resistant undercarriage.

Exclusive International 3-point-mounting allows free track oscillation for rough mine and quarry duty—and maintains positive, life-prolonging alignment. TD-20 weight rides smoothly on thick-shelled Dura-Rollers—the dual-protected track rollers that make, 1,000-hr. lube intervals practical!

Compare TD-20 performance to anything else on tracks—for capacity, economy, and long life. Measure production-boosting features like "single-stick" shift, 6-speed full-reverse transmission; and cycle-speeding Shuttle-Bar control. See your International Construction Equipment Distributor for a demonstration.



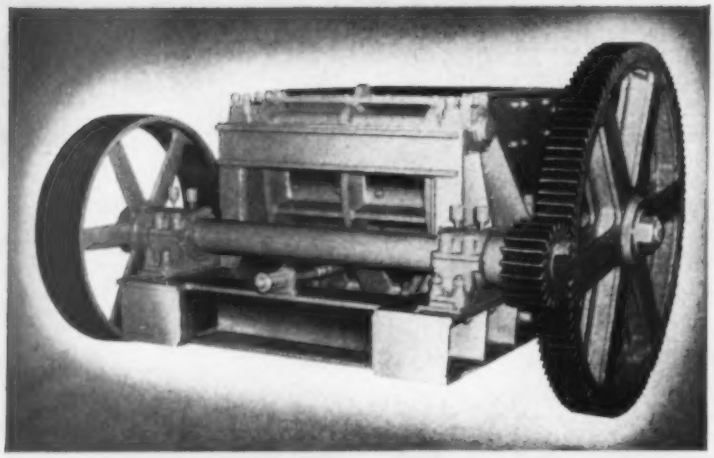
International® *Construction Equipment*

International Harvester Co.,
180 North Michigan Ave., Chicago 1, Illinois
A COMPLETE POWER PACKAGE

Enter 180 on card, page 173

Heavy-duty TD-20 Dura-Rollers are designed to defy "eat-'em-alive" mine and quarry conditions. These 1,000-hr. lube interval track rollers feature the industry's thickest shells; King-sized lube reservoirs; and full-floating, precision-fitted seals. Exclusive pressure relief passages let you power lubricate Dura-Rollers —without affecting seal life or efficiency!

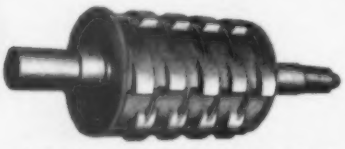
"Sweeping-up" for the shovel—the TD-20 at Crabtree Creek Quarry 'dozes hundreds of tons of granite rock daily. Heat-defying sintered metal engine clutch facings give high power-transfer efficiency—for toughest rock-'dozing and overburden-stripping work!



PENNSYLVANIA HERCULES

New job-proved single roll crusher brings you lower operating, maintenance costs

Pennsylvania has researched the factors that make single roll crushing costs mount—and come up with a new machine specifically designed, and *job-proved*, to keep costs down.



Cast alloy steel roll shell is made in one piece and keyed as well as shrunk on the rollshaft. No segments or renewable teeth to loosen or fall out. Readily accessible teeth are easily built up by welding.

Here are just a few high spots of this great new crusher:

- **Hopper jams are prevented by the larger hopper opening and spacious throat opening made possible by the contour of the breaker plate.**

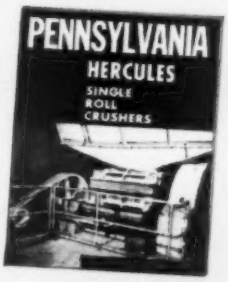
New automatic toggle release supplies positive release mechanism for breaker plate.

New design of countershaft placement, plus large diameter of the gear improve stress distribution on countershaft bearings.

Hercules bearings are away from the frame. Easy to get at, easy to maintain.

Breaker plate is heavy steel fabrication lined with cast manganese steel wearing plates; guaranteed against cracks and flaws.

If you have a job where a single roll might be used, find out more how this new Pennsylvania Hercules will save you money in more ways than one. Send for new Bulletin 2020.



PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

★ ★ ★

Over 50 years concentrated experience in all types of material reduction makes Pennsylvania your best source of crushers and engineering advice and service. Call on Pennsylvania with your next crushing problem. Representatives from coast-to-coast.

PENNSYLVANIA
BATH-BUILT
CRUSHERS

Manufacturers' News

Harnischfeger Corporation is decentralizing its sales organization in order to achieve closer relationship between field activity and management.

The firm is dividing the United States into three major sales regions. Also, a newly created sales manager position is being established for each region. The company has selected three men from its sales organization

J. E. Laffey

W. H. DeHuff

to head the regional districts. The new managers and their regions are: WILLIAM H. DEHUFF, western region with headquarters in San Francisco; J. C. HUNTINGTON JR., central and southern region with headquarters in Milwaukee; and J. E. LAFFEY, eastern region with headquarters in Teterboro, N.J.

D. K. Kauffman

J. C. Huntington Jr.

The Ceilcote Company has announced the appointment of D. K. KAUFFMAN as manager of the company's two manufacturing divisions. Formerly plant manager of the Plastics Division, Mr. Kauffman will now be responsible for all phases of management in the manufacture of the company's line of corrosion-proof materials for industry, as well as reinforced plastic ventilating systems and process equipment.

R. J. CALETRI has been named advertising manager of the Bendix Products Division, Bendix Aviation Corporation to succeed S. V. HARDING who retired in October. Mr. Caletri, a staff assistant to Mr. Farrell, came to Bendix in 1958 from the Studebaker-Packard Corporation where he served as sales promotion manager of the auto parts, service and accessories division.

Florida Trailer and Equipment Company, Jacksonville, Fla. has recently been appointed service representative for the Daybrook Power Loader (hydraulic crane for trucks) and Daybrook Power Packer lines in the area.

The distributor has been a Daybrook sales and service representative for steel and aluminum dump bodies, telescopic and underbody hydraulic hoists, and Power Gates.

Continental Conveyor and Equipment Company, a new corporation composed principally of personnel of the parent organization, has completed purchase of the Industrial Division of the Continental Gin Company, Birmingham. While currently operating from the original base, future plans include construction of and removal to a new site in Winfield, Ala.

Rankin Manufacturing Company announces a new colorful convenient package for three of its welding rods. In the future, RANITE No. 4 acetylene rod, and RANTUNG acetylene and electric rods will appear on shelves in 5-lb. packages. These cartons have steel reinforced corners and are available in attractive 50-lb. shipping cartons.

FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

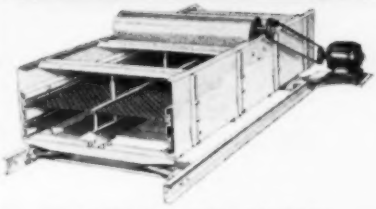
Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

Enter 183-A on card, page 173

FOR PROFITABLE
SCREENING USE
UNIVERSALS



• FAST, SIMPLE, RUGGED
• DEPENDABLE
• ECONOMICAL
• STOCK DELIVERIES
• FAST SERVICE

Write today for free catalog No. 150
on screens and screening

UNIVERSAL
VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

Enter 183-B on card, page 173

PERMASEAL® Idlers – installed for 42", 48" and 60" belts at 10,000 ton per day coal handling facility on Ohio River.

NEW-TYPE CONVEYOR IDLERS STRETCH GREASING INTERVALS TO YEARS

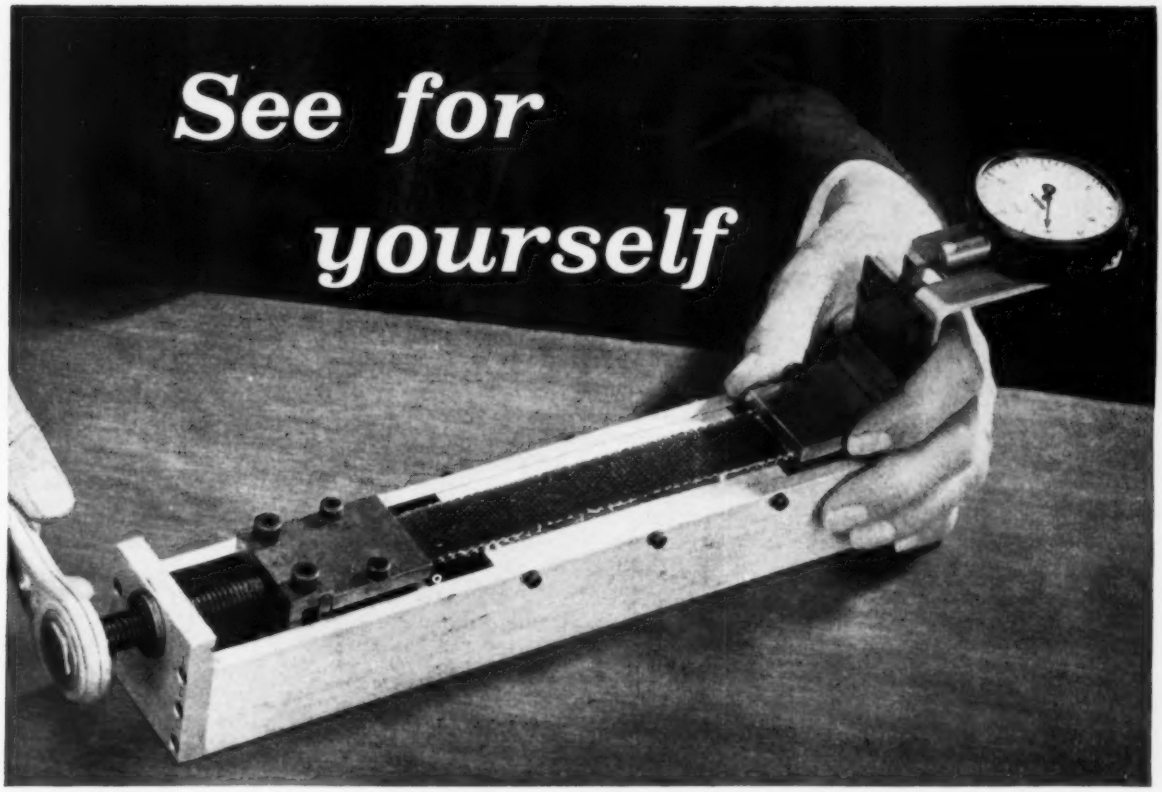
Grease 'em by-the-month idlers are expensive to maintain. The Jeffrey PERMASEAL® Idlers in this coal handling system won't need greasing for a year—maybe several years. Their slightly higher initial cost (due to superior bearing protection) is quickly absorbed by unparalleled low cost of maintenance.

Bearing failure is the major cause of idler failure. The PERMASEAL® Idler's unique double seal design protects bearings as they have never been protected before. On coal handling systems and dirty, abrasive handling jobs, Jeffrey PERMASEAL® Idlers are proving their ability to outlast any other idler on the market.

Get more data on PERMASEAL® Idlers. Your materials handling supervisor should have all the facts on PERMASEAL® Idlers. Contact a Jeffrey distributor, or write The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING



BOSTON Balanced Belt Construction prevents premature belt failure

BBC equalizes ply stress . . . eliminates overstrained plies, the most common cause of premature rupture and belt failure. BBC is the result of two unique BOSTON processes: Electro-Tensile Control (electronic control of ply tension) and Rotocure (continuous vulcanization for assured belt uniformity). 1296 belt tests prove it: BBC provides longer service life, lower operating costs.

DULON Covers prolong belt life

Another exclusive BOSTON research development, DULON greatly improves cover aging. Tough, specially treated DULON compounds stay resilient longer . . . dramatically withstand the roughest abrasion, gouging, tearing, oxidation. DULON has been proven more resistant than any other cover ever developed. DULON covers have proven their amazing performance on the toughest jobs.

The BOSTON belt with the DULON Cover had a service life over 5 times greater than the competitive construction.

Your Boston representative will demonstrate at your desk Boston's exclusive Balanced Belt Construction. Simply call him now and see for yourself.

AMERICAN BILTRITE RUBBER COMPANY
BOSTON WOVEN HOSE & RUBBER DIVISION
BOSTON 3, MASSACHUSETTS

BOSTON

Deere & Company has worked out with Boothe Leasing Corporation a nationwide plan that will permit customers to lease John Deere industrial tractors and equipment.

The plan, believed first of its scope and type, will operate through the John Deere dealer organization. Providing the dealers with a new sales tool, the plan will supplement the John Deere credit plan, under which a customer purchases equipment outright on time payments. The dealer will carry out normal service and warranty operations.

A. D. LUMSDEN has been appointed manager of operations of the Wire Products Department, Hewitt-Robins Incorporated, Stamford, Conn. He will be headquartered at the company's wire products plant in King of Prussia, Pa.

Mr. Lumsden was product sales manager of the wire products department, and prior to that was New York regional sales manager of the company's Foam Products Division.

Winner of the first annual "MEI Student of the Year" award is DONALD K. HAYES of the Link-Belt Company, Indianapolis. The announcement is made by Allen Ray Putnam, managing director of the American Society of Metals, in behalf of the Metals Engineering Institute.

Mr. Hayes, a laboratory technician on metallurgical problems involved in production, is cited for completing the MEI "Heat Treatment of Steel" course in only eight months with an excellent 97 average.

As MEI Student of the Year he will receive his choice of the 20 courses currently offered by ASM's Metals Engineering Institute, a fully accredited program of correspondence courses in metals engineering for home study, in-plant training, or ASM Chapter use.

In operation for 2½ years, the Metals Engineering Institute has enrolled nearly 3,000 students from 44 states and 22 foreign countries. It is one of the many educational activities of American Society for Metals, the 31,000-member engineering society for the metal industry.

Barber-Greene Company, of Aurora, Ill., is reorganizing its field sales management setup. Included in the changes are an increase in the number of resident district sales managers, and appointment of eastern and western regional sales managers to supervise the field sales activities.

RALPH DANO, with the company 36 years, and most recently an area manager out of Aurora, is responsible for the western division. KENT SHELL, area manager out of Washington, D.C., has been made manager of the eastern division.

TOM BENBOW, most recently area manager out of Atlanta, Ga., has been appointed field sales manager, supervising all company district sales managers and training field engineers.

T. Benbow

J. Davis

JEFFERSON J. DAVIS, formerly vice-president in charge of product divisions at Electric Steel Foundry, has been named executive vice-president.

WILLIAM E. MEADOR has been named assistant sales manager of The Long Company, Oak Hill, W. Va., equipment manufacturer. Mr. Long was formerly southern West Virginia sales representative for the firm.

CHARLES MILNAR, a veteran employee with 31 years of service in the Engineering Department of the American Hoist & Derrick Company, St. Paul, Minn., has been appointed to the newly created post of chief service engineer of the Customer Service Division. In assuming his new duties, Mr. Milnar will also be responsible for liaison and communication between the Customer Service Department and the Engineering Department.

MASTER MECHANICS CORNER:

Ted Combest, Master Mechanic in charge of the equipment spread for L. A. & R. S. Crow, General Contractors, El Monte, California, working in rock, sand and gravel on Highway U.S. 101 Project near Eureka, Calif.

"I've found through actual on-the-job experience that Cat cutting edges wear twice as long as other makes. We just can't afford to use any other make of edge."

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U.S.A.
Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Enter 186 on card, page 173

THREE CAT DW21-PR21s *climb 8% grades with 31 tons of clay and limestone*

...and new DW20 and DW21 Series G Tractors have more muscle for even better performance

At Brandon, Miss., Marquette Cement Manufacturing Co. keeps three Cat DW21s with Athey PR21 wagons busy hauling clay and limestone to crushers. They climb 8 per cent grades on the 2000-foot haul with big 31-ton loads.

Good performance, but new Cat DW20 and DW21 Series G Tractors can boost this. With greater rimpull, higher speeds and stronger components, these new tractors with either wagons or new larger scrapers can better their predecessors on just about any job you've got for them to do. Better performance means just one thing . . . more profit for you.

Both the DW20 and DW21 put 345 HP (max. output) to work. There's 12 per cent more rimpull to give you as much as 20 per cent faster travel speeds under similar haul road conditions, compared to former models. Both tractors have stronger final drive gears and improved transmission shifter forks.

See your Caterpillar Dealer for a chance to operate the new DW20 or DW21 Series G with SynchroTouch Transmission Control—the advanced new way to shift gears easier and faster. Your operators just dial the gear for automatic, split-second response. This optional control makes it easy to choose the right gear for maximum efficiency.

Get to see and try these new tractors at your Caterpillar Dealer's soon. Before you do, think of the toughest test you can for them. Then, when the day comes, see if they don't beat your expectations . . . and then some.

Caterpillar Tractor Co., General Offices, Peoria, Illinois, U. S. A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BORN OF RESEARCH
PROVED IN THE FIELD

The Thompson-Ramo-Wooldridge Products Company has established a sales engineering office which is headed by RIGDON CURRIE, southwestern regional sales manager, in Houston, Texas. Mr. Currie is responsible for all sales activities in Texas, Oklahoma, Arkansas, Louisiana, and New Mexico for the computer firm.

Heading the newly opened office in Washington, D. C., is JAMES M. CAROLAN, southeastern district sales manager. His district takes in Virginia, West Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, and Florida.

ELBERT A. HAMILTON, retired sales executive of Raybestos-Manhattan, Inc., died January 6 at his residence in Birmingham at the age of 69. He had been associated with the firm since 1916.

CARL MULLEN, 50, vice-president in charge of research and development at Gates Rubber Company, was elected chairman of the Technical Committee of the Rubber Manufacturers Association, Industrial Rubber Products Division, at a recent New York Meeting.

HAROLD R. KRUEGER has been appointed to the newly created position of assistant sales manager of the Machinery Division of Stedman Foundry & Machine Co., Inc., Aurora, Ind. Mr. Krueger has been a sales representative at Stedman for the last 5 years.

H. R. Krueger

P. B. Bradley

Bradley Pulverizer Company, Allentown, Pa., has appointed PETER B. BRADLEY as executive vice-president. Mr. Bradley had previously served as general manager of the firm, which manufacturers roller mills.

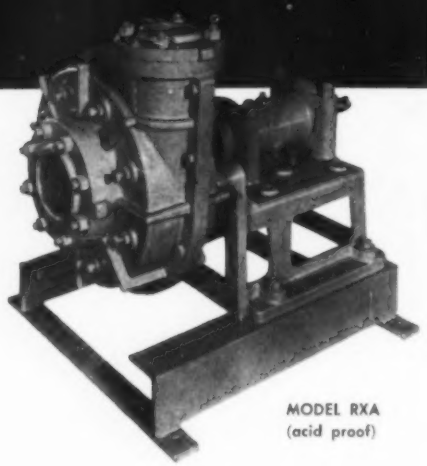
J. A. PIERCE of Harbison-Walker Refractories Company, Pittsburgh, Pa., has been promoted to manager of technical sales. Mr. Pierce has been a member of the Technical Sales Department since 1951.

The American Brass Company, Waterbury, Conn., a wholly owned subsidiary of The Anaconda Company, announced plans for the construction of a $1,500,000 research center. Ground will be broken in early summer, and completion is scheduled for 1961.

The Brass Company's new research center will include metallurgical, corrosion and chemical laboratories, and equipment for experimental production of new products as well as offices for the company's central technical staff.

NEW!

PERFORMANCE-PROVED CERAMIC-LINED SAND PUMP



MODEL RXA
(acid proof)

ARE YOU USING pumps for transferring fines? Is the volume in the range of 110′ head-150 GPM to 70′ head-600 GPM?

ARE YOU TIRED of replacing impellers, liners, shells, sleeves, seals, bearings, shafts, bolts, nuts, gaskets, etc., every few months?

ARE YOU WISHING someone would produce a pump worthy of your expectations? Something that would hold up for say — 14 months? 18 months? 2 years!

YOU WILL FIND the ultimate in wear resistance in ceramic lined pumps using silicon nitride bonded silicon carbide wear parts.

SOUND EXPENSIVE? Not at all. Cost is comparable to alloyed iron or rubber lined pumps.

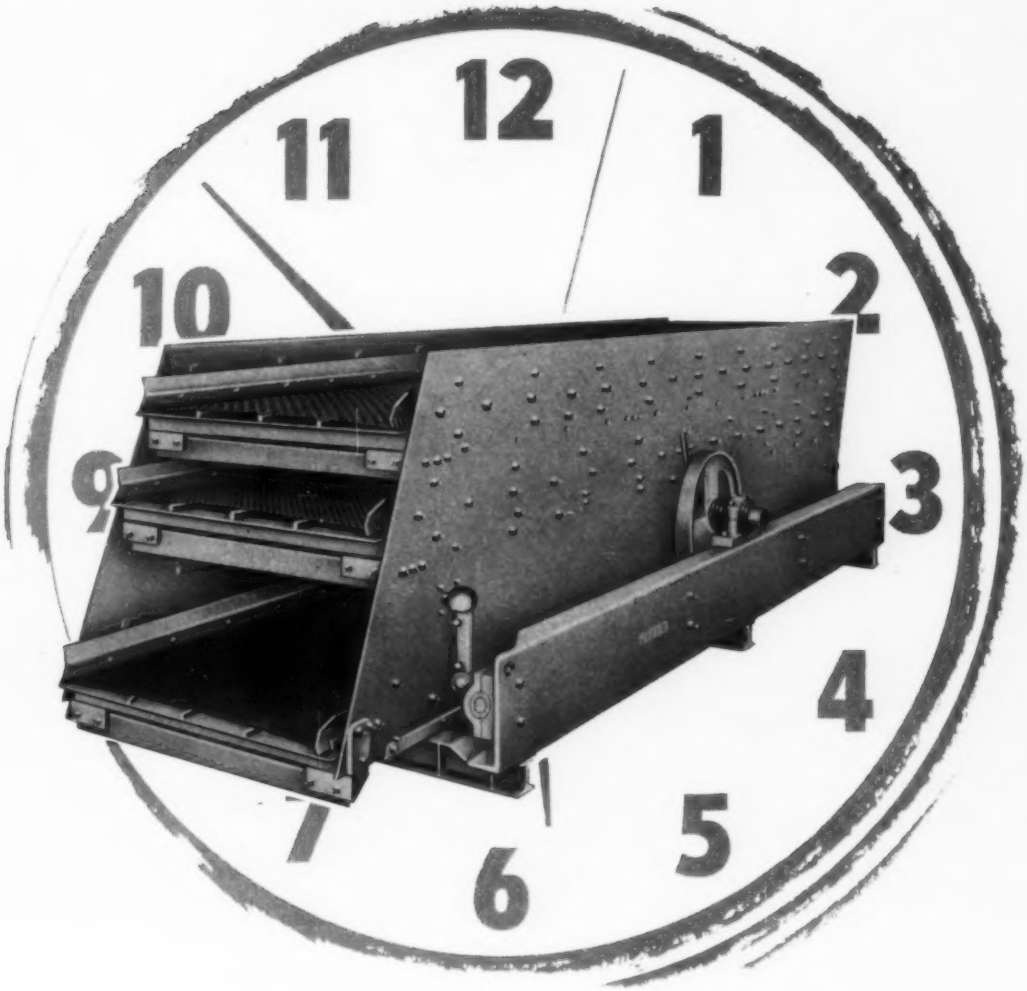
For additional information on the new MODEL RXA Ceramic-Lined Sand Pump, write:

The KANSAS CITY HAY PRESS COMPANY
801 Woodswether Road Kansas City 6, Missouri

Enter 188 on card, page 173

make time work FOR you in '60

PUT "TIME-CONSCIOUS" SECO SCREENS ON YOUR JOB!



Don't go into the competitive 60's with time-wasting equipment in your plant. Every hour lost, every slowdown in production, every inaccurately screened ton of material robs you of PROFITS. TIME IS MONEY! PUT "TIME-CONSCIOUS" SECO VIBRATING SCREENS in your plant now, and you'll get 60 minutes production from every production hour . . . right through your peak season. Moreover, you'll get the kind of production that today's buyers demand . . . clean, accurately sized product. Yes, make time work for you . . . not against you this year, with "TIME-CONSCIOUS" SECO screens on your job.
Wire, phone or write.

SCREEN EQUIPMENT COMPANY, INC.
BUFFALO 25 **NEW YORK**

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

SECO BUILDS OVER 450 MODELS IN 4-BEARING AND TWIN BEARING TYPES. SEND FOR FREE SECO LITERATURE.
(4-Bearing Catalog #204 and TWIN BEARING Booklet TB-21)

When you're talking about a $162,000 dipper shovel, you've got to talk about the best rope for it

Talking about or working with, the same thing applies. Anything below Royal Blue's performance level is simply unrealistic. Like looking for a cut-price brain surgeon.

Even at $162,000, the cost of wire rope is important. That's why so-so ropes can cost you more in the long run, because so-so ropes are *short run*. Royal Blue, on the other hand, is built by America's oldest manufacturer of wire rope to last, to do the job without a whimper. Here's why.

Royal Blue is made from the toughest rope wire ever made—Type 1105—extra high-strength improved plow steel. This pedigree gives to the rope qualities that you can't find in any other rope: exceptional resistance to shock, abrasion, fatigue and impact. Add to these a flexibility that age cannot wither nor hustling fade and you've got a collection of characteristics that make Royal Blue the strongest rope you've ever used.

A $162,000 Dipper Shovel deserves the best and your Roebling Distributor has it . . . Royal Blue. For information, write to Roebling's Wire Rope Division, Trenton 2, N.J.

ROEBLING

Branch Offices in Principal Cities

John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

No. 6 Electric Blasting Cap.
2 inches of reinforced "Primacord".
150 feet of LEDC.
Which makes the least noise?
Answer All three items produce the same amount of noise. Thus when you use the low noise level trunk line blasting system, you reduce noise levels considerably below equivalent quantities of the other items.

Shhhh!

New Du Pont delay blasting system* hushes the noise of quarry, open pit and strip mine blasting

If you have been burying your "Primacord" trunk lines, or have reluctantly switched to electric blasting caps in order to reduce the noise level of your blasting, here's good news.

Reduces noise The new Du Pont Low Noise Level Trunk Line Delay Blasting System* uses LEDC (Low Energy Detonating Cord) developed by the Ensign-Bickford Company in a cooperative program with Du Pont. It muffles the noise without the nuisance and expense of burying the cord. 150 feet of LEDC makes no more noise than one electric blasting cap!—or 2 inches of ordinary "Primacord"!

2 grains per foot This low noise level trunk line system contains only 2 grains of explosives per foot, as contrasted to 50 grains per foot in the regular "Primacord." It is this tiny load that keeps the noise level down. Our customers report noise and vibration complaints from neighboring residents were actually eliminated, when LEDC trunk lines were recently introduced.

Other features This system uses trunk line delay connectors, available in intervals of 10, 15 and 25 milliseconds. You can select the interval best suited to your particular blasting problem. The low noise level trunk line delay blasting system provides an unlimited number of periods at intervals of 10, 15 or 25 milliseconds. And at no time is it ever necessary to place a blasting cap in the borehole.

Available now Your Du Pont distributor or representative can help you reduce your noise problem with new LEDC at once, or answer your questions about it. Call him. Or write Du Pont, Explosives Department, 6440 Nemours Bldg., Wilmington 98, Del.

**Patent applied for*

DU PONT EXPLOSIVES

REG. U.S. PAT. OFF.

Better Things for Better Living . . . *through Chemistry*

OWEN BUCKETS

THE GIANT OF THEM ALL

The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
2. One-Piece Head Construction
3. Riveted Bowl Assembly
4. Single Main Shaft
5. Recessed Lips

Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.

Put the Giant on your crane — OWEN — and know the work will be done faster, better and more economically.

Write today for any specific or additional information

The OWEN BUCKET Co.
BREAKWATER AVENUE, CLEVELAND 2, OHIO
BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

Enter 192 on card, page 173

D. A. BESSMER, president of The Timken Roller Bearing Company, has announced that Timken France, a division of the company, will build a 15,000-sq. ft. shipping center at its plant in Colmar. France. The center, equipped with much automatic handling equipment, and costing an estimated $300,000, will be an extension of Timken's new finishing building. Colmar, located near the geographic center of the Common Market countries, is considered an ideal location for servicing that market.

CHARLES C. NOLAN and JACK D. POWER have been appointed district managers by Hardinge Company, Incorporated. Mr. Nolan succeeds R. L. BALDWIN, retiring western district manager, who will continue with the company on a full time basis as a consultant at the San Francisco headquarters office. Mr. Power will head the central district, with headquarters in Chicago.

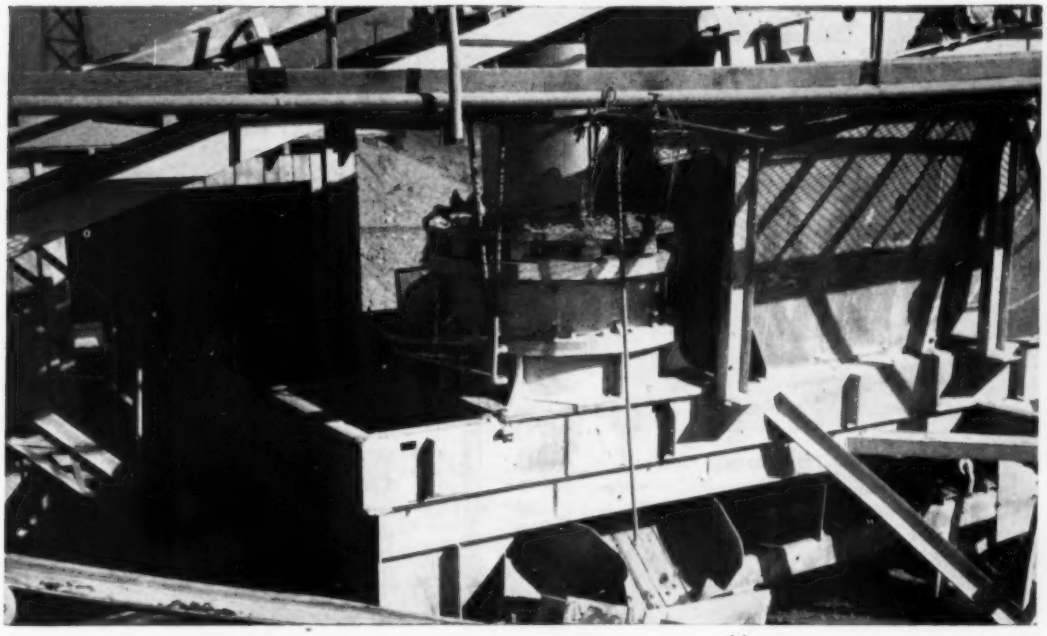
J. D. Power

C. C. Nolan

PETER H. BIRCKHEAD, a vice-president and director of the Bucyrus-Erie Company, South Milwaukee, Wis., has retired after a 43-year career with the heavy equipment manufacturer. Mr. Birckhead joined the company at South Milwaukee in 1916.

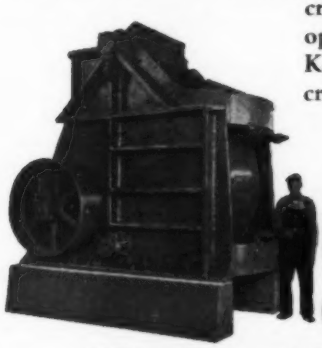
After completing his apprenticeship, Mr. Birckhead began a long and successful career in the sales end of the business. He worked in the Chicago and San Francisco offices for several years, returning to South Milwaukee in 1928 as assistant general sales manager. He was promoted to domestic sales manager in 1930, general sales manager in 1934, vice-president in charge of sales in 1943, and a director in 1952.

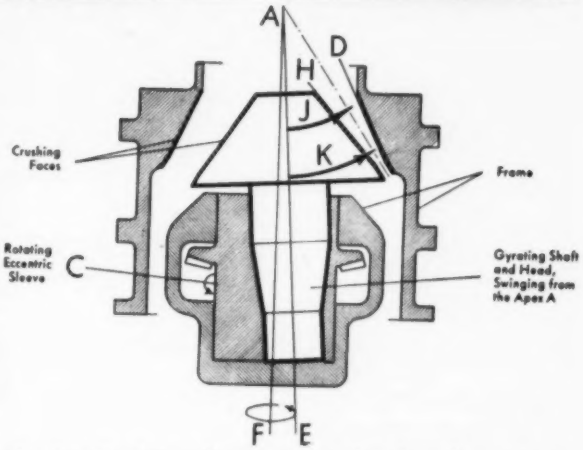
Compact KUE-KEN® for economical gyratory crushing where headroom is limited



Low cost gyratory crushing is now practical in flow sheets where headroom is limited. Taking choke feed, Kue-Ken gyratory fits into virtually any installation . . . permanent or portable. Though exceedingly strong, it weighs less yet has larger shaft and bearings. Operating on the exclusive Kue-Ken principle of crushing without rubbing, Kue-Ken crushes continuously for months with minimum liner wear. Rock is crushed squarely without the upward abrasive action that quickly wears out liners of conventional crushers. For lowest cost per ton crushing, design your operation around Kue-Ken jaw and gyratory crushers.

WRITE FOR CATALOG





See how Kue-Ken crushing faces pass through crushing zone on arcs J and K to crush rock squarely without rubbing liners.

KUE-KEN® CRUSHERS

"Crushing without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers
Revolving Screens · Classifiers · Feeders · Rib Cone Ball Mills
Concentrating Tables · Vibrating Screens

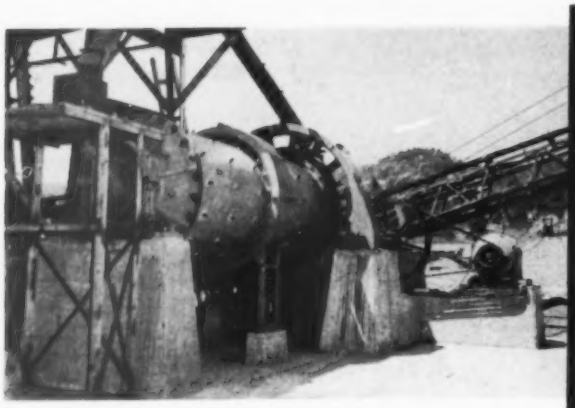
DEALERS:

SEATTLE, WASH.	Washington Machinery Co.
BUTTE, MONTANA	Hall-Perry Machinery Co.
VANCOUVER, B. C.	Universal Equipment Co.
SALT LAKE CITY, UTAH	Lund Machinery Co.
SAN ANTONIO, TEX.	Closner Equipment Co.
LOS ANGELES, CALIF.	Garlinghouse, Freman Co.
SAN FRANCISCO, CALIF.	Aggregate Engineers, Inc.
PORTLAND, OREGON	Air-Mac, Inc. of Oregon
BISMARCK, NORTH DAKOTA	Midwest Equipment Co.
PHOENIX, ARIZ.	Road Machinery Co.

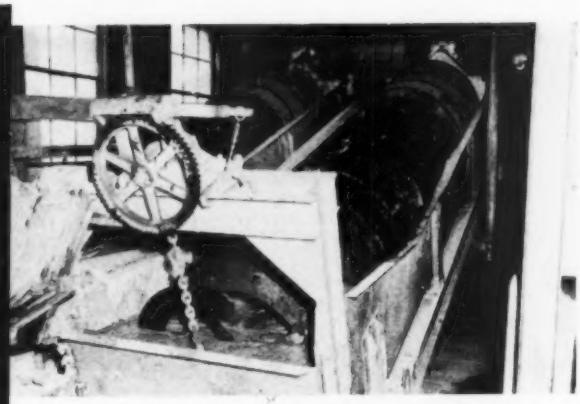
Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacture and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

Need specification aggregate?

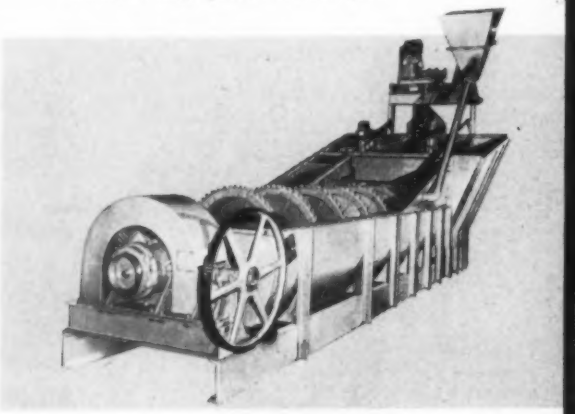
4 low-cost ways to produce it, on location!



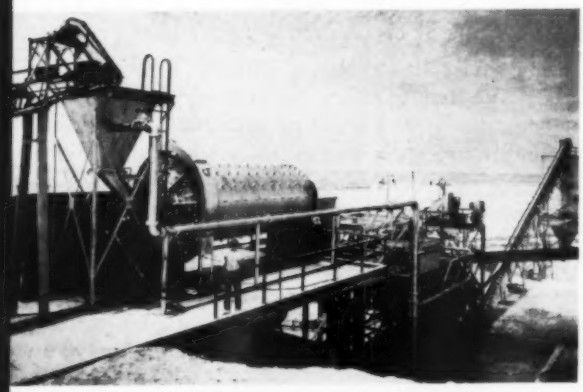
1 *Grinding with Marcy CPD Rod Mills* Grinding stone or waste pea gravel in a Marcy Mill results in a superior, cubical product for blending to meet the most rigid specifications. Marcys have kept many small operators in business; and, have been used on almost all large government dam jobs.



2 *Washing and Classifying with Akins Classifiers* With the Akins Classifier you can wash, deslime, dewater, and *remove or save* sand sizes as desired. A large *working* pool area in classifier is required to do this work...the Akins gives you more working pool area per dollar.



3 *Separating with Akins Heavy Media Separators* Many deposits can be most efficiently treated by the Akins heavy media process. The Akins' large *working* pool area permits close control of products from feed of variable quality or quantity. Reduced media recirculation in the Akins results in lower total horsepower required.



4 *Scrubbing with Marcy Heavy-Duty Scrubbers* Thorough, efficient removal of clay from sand can be accomplished with Marcy Scrubbers. The Marcy principle of small diameter, long length scrubbers gives longer retention time, more contact for scrubbing, less short-circuiting, and lower horsepower...a principle which has been proven on difficult washing of iron ore.

Write for Complete Information

The Company that cares enough to give you the best!

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

DENVER 16	NEW YORK 17	SALT LAKE CITY 1	EL PASO	ALBUQUERQUE
3800 RACE ST.	122 E. 42nd ST.	121 W. 2nd S.	1515 11TH AVE.	701 HAINES N.W.

Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

These are the men who make up the Associated Equipment Distributors executive team for the trade association in 1960. From the left they are: P. D. Hermann, AED executive secretary; Braxton Blalock Jr., Blalock Machinery Co., Inc., vice-president; H. J. Mayer, Western Machinery Co., senior vice-president; J. A. Benson, Benson Tractor Co., AED president, R. F. Newlin, Newlin Machinery Corp., vice-president; R. Boyd Somerville, Ontario Equipment & Supply Ltd., vice-president; and W. R. Parnell, Construction Machinery Corporation, treasurer. The AED expects a year of moderate increase and profit.

As we went to press, news came in of Mr. Benson's death, at 60. He had been active in AED for more than 15 years. His entire business career was spent in the sales of construction equipment in Texas. His firm is a leading distributor of Allis Chalmers tractors in the Southwest.

● Two newly formed groups have been announced at the Le Roi Division, Westinghouse Air Brake Company, by R. H. KOEHLER, general sales manager. The changes are part of a reorganization, made to sell by markets rather than by product lines.

R. L. McChain

D. S. Permar

R. L. MCCHAIN, as manager, with assistant managers C. L. MEIGS and N. W. REINKER, will head the group concentrating on the construction, mining, and quarry industries. D. S. PERMAR, assisted by E. R. COUCH, will head air compressor sales to the general industrial market.

It is planned to increase the sales force in both market groups for increased coverage of United States and Canada.

● The H. B. Large Engineering Company has moved its sales and administrative headquarters from Pasadena, Calif., to Douglas, Ariz. The firm's line, including the "Duraclone" wet cyclone used in the sand-and-gravel industry, will continue to be manufactured at the Downey, Calif., factory.

● American Cyanamid Company will close its industrial explosives plant in Grafton, Ill., on March 31, and the plant and 890-acre site will be offered for sale, it was announced by Dr. William H. Bowman, general manager of the Organic Chemicals Division, which operates the facility. Grafton is about 35 miles north of St. Louis, Mo.

"Further operation of the Grafton plant is not economically justifiable," Dr. Bowman said, "in view of the technological changes occurring in the explosives market and the new money which Cyanamid would have to invest in order to modernize the facility."

Cyanamid will make every effort to assist the plant's 74 employees in locating other jobs, Dr. Bowman stressed.

The Company that cares enough to give you the best!

Massco-Grigsby

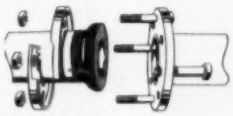
PINCH VALVES

RUBBER, NEOPRENE
for Corrosion and Abrasion

- 1" to 14" inside diameter.
- Pressures to 150 psi.
- Temperatures to 200° F.
- Patented "hinged" sleeve. Recesses serve as "hinges" during compression; reduce strain and permit tight closing.

- Cannot leak or stick.
- No working parts in contact with pulp or liquid; no packing glands.

- Unobstructed flow eliminates high friction loss.
- Remote control available.
- Can be equipped for automatic regulation.



- Split flanges and patented Flex Seal ends assure perfect seal.
- Closing mechanisms... manual handwheel; handwheel with chain and sprocket reduction unit; electric worm gear motor reducer; chain operated torque arm reducer; hydraulic; air-hydraulic.

WRITE FOR NEW CATALOG...

Manufacturing Division

MINE AND SMELTER SUPPLY CO.

3800 RACE STREET • DENVER, COLORADO
OFFICES AND AGENTS IN PRINCIPAL CITIES

Enter 195 on card, page 173

FOR ROTARY KILN LININGS:

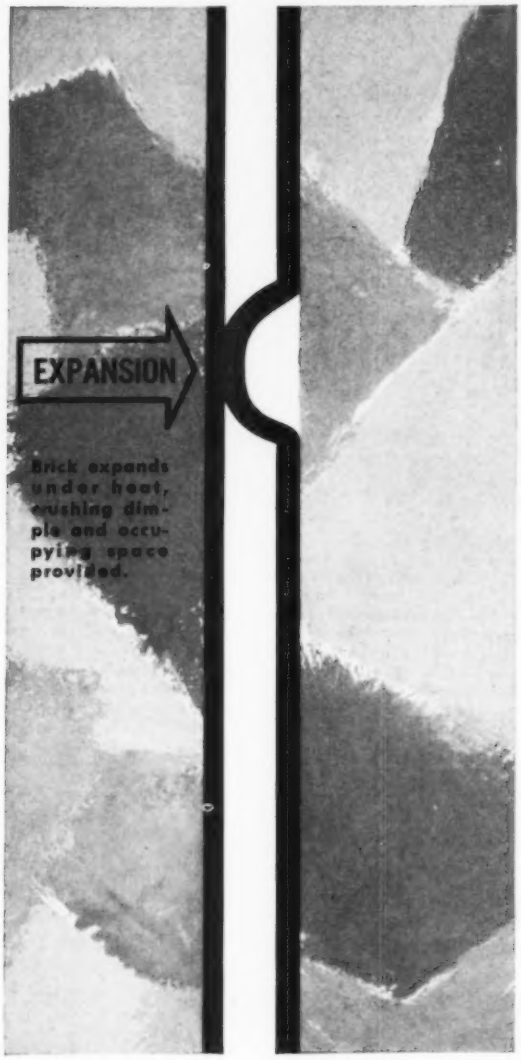
Porter Kilmag Brick

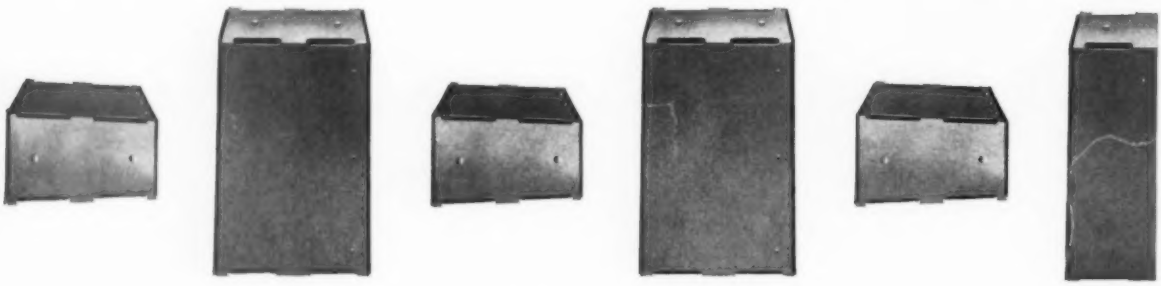
requires no "paper work"... dimpled steel spacers set up perfect expansion allowance

Porter Kilmag is a burned, magnesite-chrome brick with patented* "dimple" cladding . . . *an exclusive Porter feature!* Because of Kilmag's dimple cladding, you get these important mechanical advantages: (1) Kilmag requires no added labor, "paper shimming" or other field expedients to establish proper expansion. (2) Kilmag lays up faster. (3) Kilmag reduces labor costs. (4) Kilmag's expansion dimple is permanent *regardless* of storage conditions.

Kilmag's refractory qualities match its mechanical excellence. A dense, thoroughly burned structure provides uniform strength from cold to hot face, under stress. Kilmag has an exceptional ability to build and *hold* a clinker coating. Kilmag brick are available in 6" arches and 9" wedges. One shape turns a given diameter, plus a 2½ and a 3¼ brick for keying up.

For complete details on cost-saving, high efficiency Porter Kilmag, or *any* refractory application, write: *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.* *Pat. Pending





REFRACTORIES DIVISION **PORTER** H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION, PEERLESS ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO, S.A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.

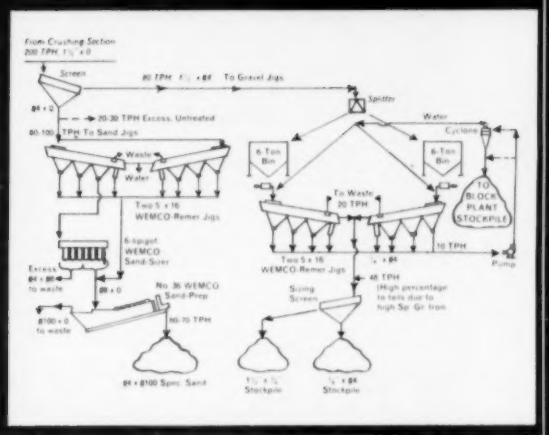
SHALE IN YOUR HIGHWAY PAVEMENTS?

"NOT WHEN YOU USE WEMCO® -REMER JIGS!"

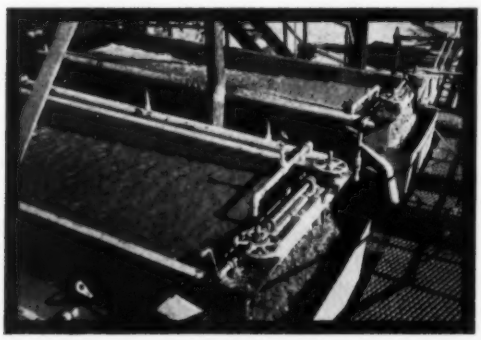
(The only Jig that will treat fine aggregates)

John J. Simmons, Manager of Dakota Aggregates, Ironton, North Dakota reports:

Feed	To Sand Jigs	To Gravel Jigs
Shale	12%	5%
Iron Oxides	4%	3%
Product	**From Sand Jigs**	**From Gravel Jigs**
Shale Iron Oxides	1%	1%



"We could not meet highway specifications without the Wemco-Remer Jigs."



"These machines take a feed containing up to 12% shale and iron oxide and produce a product nearly free of unsound material. We have found that the long uninterrupted jig bed provides for a high percentage rejection of shales and light iron oxides which results in a very clean product. The rugged construction gives a low down-time operation while simplicity of design and ease of product control have enabled us to choose our operators from the nearby farm areas. We have become familiar with other types of jig units during our iron ore operation in Minnesota and Michigan, and we are satisfied that the Wemco-Remer Jigs have provided us with the results originally anticipated."

Need More information on Jig performance?
Talk to your nearest Wemco representative.

WEMCO®

a division of
Western Machinery Company
650 Fifth Street, San Francisco 7, California
Distributors throughout the world

THE WEMCO LINE OF QUALITY MACHINES FOR PROFITABLE AGGREGATE PROCESSING

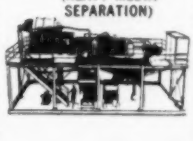
SAND-PREP WITH EXCLUSIVE LIFTING DEVICE

SAND-SORT

SAND-CLONE

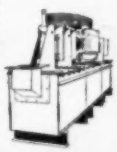
ROCK & SAND JIGS

MOBIL-MILL (HEAVY MEDIA SEPARATION)



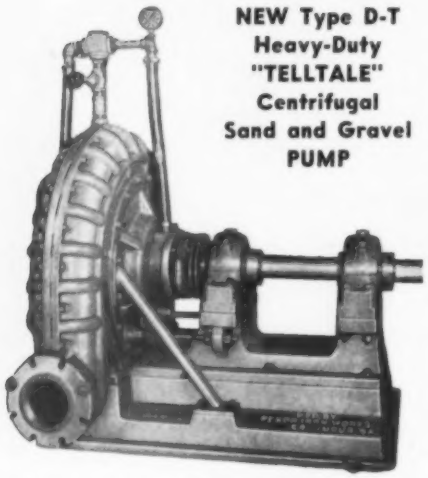
SAND-SIZER

SAND-SCRUBBER



PUMPS

LOOKING FOR A BETTER SAND AND GRAVEL PUMP?



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Have a look at the Type D-T Heavy Duty "Telltale" Pump. Its production is the talk of the industry wherever it has been put to work. Likewise, what it can take under what would be heavy overloading for an ordinary pump.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pumps to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

Pekor Iron Works, Inc.

ESTABLISHED 1892

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

Enter 198-A on card, page 173

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal —no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300% —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Enter 198-B on card, page 173

Walsh Refractories Corporation. St. Louis, Mo., has promoted RALPH L. SANFORD to manager of its St. Louis Plant. Mr. Sanford was formerly assistant to William P. Charbonnier, now technical advisor to the vice-president in charge of glass refractory sales.

P. A. Kubik

PHILIP A. KUBIK has been promoted to district sales manager, Cleveland office, by Vickers Incorporated. Mr. Kubik joined the company in 1953 and was assigned as application engineer, mobile products, in 1956.

JOHN R. NOREEN has been appointed purchasing agent for the Jones Machinery Division of Hewitt-Robins Incorporated in Chicago.

CHARLES B. TOWNSEND, manager of the Sycamore, Ind., mill of the Anaconda Wire & Cable Company for more than 16 years, retired in January, and has been succeeded by MELBOURNE J. MAERTZ, superintendent.

Mr. Townsend, who has been with Anaconda Wire & Cable since it was formed in 1929, was appointed manager of the Sycamore plant in 1943, and has served in this capacity since. He had been general superintendent and superintendent of the company's South Mill in Sycamore for 12 years, and at one time was a purchasing agent for the company.

Mr. Mertz has been superintendent of the Sycamore plant since 1943. He has been with Anaconda Wire & Cable since 1932.

Brunner & Lay, Inc., Franklin Park, Ill., has assigned H. P. ANDREWS as sales representative in Louisiana, Mississippi, and eastern Texas; J. F. FITZPATRICK in Iowa, North and South Dakota, Minnesota, Nebraska, and Wisconsin.; B. E. HARTMAN in Arkansas and Oklahoma; and LLOYD MARTIN in western Texas and New Mexico.

THE ALL-NEW ALEMITE 7138 V.P. PUMP

for newest multi-purpose lubricants!

Completely new – and only Alemite has it! The compact, portable 7138 V.P. Pump is especially built to accommodate today's modern lubricants . . . gives both high volume and high pressure lubrication. Just a turn of the handy V.P. Selector sets pump for the type of lubrication you want. Delivers one cubic inch per stroke into gear cases – 5,000 P.S.I. for bearings.

Lightweight . . . manually operated . . . built for heavy-duty service. Strong handle and toggle link . . . dust-proof aluminum cover . . . convenient carrying handle. Fits any 35-pound container.

The Model 7138 is endorsed by major oil companies for use with multi-purpose lubricants. Typical applications in the construction industry include servicing of power shovels, back hoes, bulldozers, power graders and small drag lines. Ideal in the mining industry for lubricating coal cutters, loaders and borers.

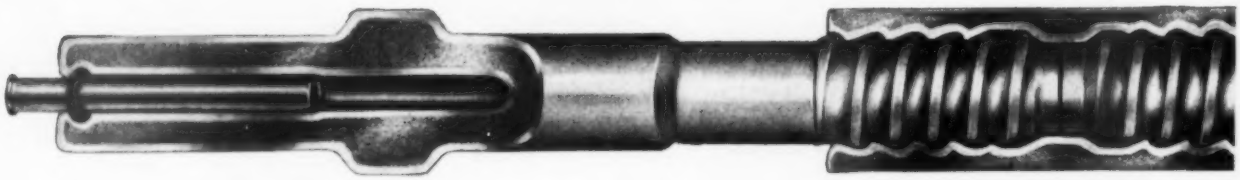
Write today for full information.

Symbol of SW Excellence

ALEMITE
DIVISION
STEWART-WARNER
CORPORATION

Dept. L-30, 1850 Diversey Parkway, Chicago 14, Illinois

You'll scrap all your old ideas about drill steel when

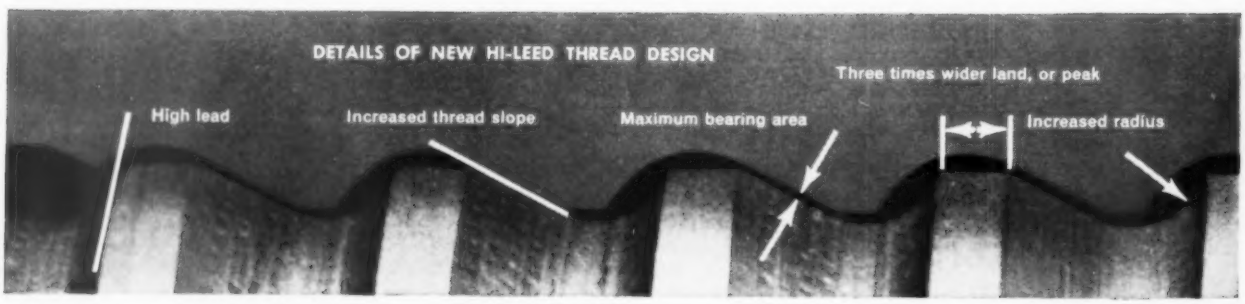


ONLY GARDNER-DENVER

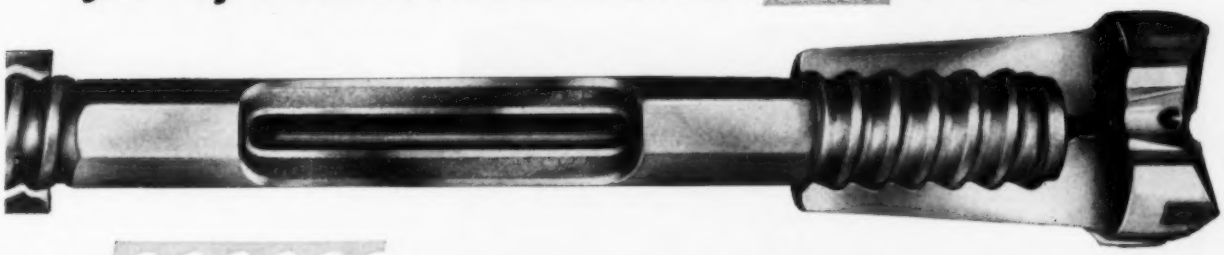
gives you all these field-

ALWAYS UNCOUPLES BY HAND

New HI-LEED thread design makes wrenching unnecessary. Gardner-Denver engineers have incorporated field-proved reverse buttress design into an entirely new thread form that always uncouples by hand.



you try NEW GARDNER-DENVER *HI-LEED* STEEL



HI-LEED DRILL STEEL

proved advantages

CUTS DRILLING TIME ON EVERY HOLE

HI-LEED steel saves time in adding rod . . . and ease of uncoupling, without use of wrenches, helps drill hole faster.

SENDS MORE IMPACT TO THE BIT

HI-LEED sectional steel transmits drill impact almost as well as a solid rod. That's because precision-milled threads on rod and coupling are in close contact over a large total area, thus holding rod ends firmly together.

DRILLS MORE FOOTAGE PER ROD

HI-LEED rods are designed to last longer than any other sectional steel, and the wide thread peak assures maximum wear.

Design details are carefully engineered to eliminate much of the usual friction and stress concentrations. Carburizing and shot-peening give the steel a hard surface and tough inner core.

PREVENTS LOST HOLES

New HI-LEED design keeps mating parts snug—rods won't uncouple in the hole or while pulling out. Other thread forms may not hold a tight connection and many rod strings have been lost in the hole while pulling out with rotation on.

Drillers who have used this unique and revolutionary Gardner-Denver thread design are enthusiastic about its convenience and economy. Give it a try on your own rock drills—you'll soon see why. Call your Gardner-Denver drill steel specialist, or write for new bulletin on HI-LEED steel.

GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER - DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Wherever Ore Moves, SCOOT-CRETE

Ore Carriers Move It • FASTER • EASIER • AT LOWER COST

SCOOT-CRETE CD-4, shown being loaded in mine, will carry up to 15 tons payload. Model CD-3N has 5-ton payload. Note driver's side-mounted position for maximum vision and efficiency, forward and rear.

***Throughout the world,* SCOOT-CRETE gives top-rate performance. No rails needed, no ties, no cars, no independent power source. Diesel-powered for operation inside the mine, SCOOT-CRETE carriers are rugged for around-the-clock service; carry up to 15 tons at speeds to 15 mph, climb grades up to 18%. Available with standard or fully automatic transmission. SCOOT-CRETE has equal speeds forward and reverse for fast shuttle service. All CD models approved by U. S. Bureau of Mines for underground mining.**

Units available from 3,000 lb. to 15-ton capacity. Write for specifications and literature. See your Dealer.

GETMAN BROTHERS

SOUTH HAVEN, ZONE 6, MICHIGAN

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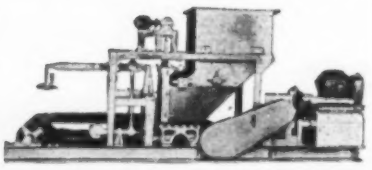
SLIDE RULE ACCURACY

for unmatched performance



SCHAFFER POIDOMETERS

The Schaffer Poidometer claims are not exaggerated. (They need not be)

The superior performance of Schaffer Poidometer stands alone to industry as being unequalled, unmatched under every working condition, and low-cost upkeep.

Poidometers give automatic performance in WEIGHING, BLENDING, FEEDING, MIXING, RECORDING and PROPORTIONING OF BULK MATERIALS.

OVER 1600 NOW SERVING INDUSTRY

●

WRITE FOR CATALOG NO. 5, IT HAS FULL DETAILS

SCHAFFER POIDOMETER CO.

2828 SMALLMAN ST. PITTSBURGH 22, PA.

Enter 202-B on card, page 173

A 16 mm. color and sound motion picture entitled *The Fifteenth Michigan* was shown at the National Sand and Gravel Show at the Chicago Coliseum February 15-19, at the booth of the Construction Machinery Division of Clark Equipment Company.

The 20-minute movie featured on-the-job applications of a "Michigan" line fleet of 15 Model 175A, 275A, and 375A tractor shovels owned and operated by Irving Bros., multi-plant Indiana crushed stone, sand, and gravel producers.

For information on securing the film for showing, write Construction Machinery Division, Clark Equipment Company, Pipestone Plant, Benton Harbor, Mich.

LAMAR C. LEBRON, division sales manager for Hercules Powder Company's Explosives Department, retired on December 31, upon completion of 32 years' service.

Mr. LeBron joined Hercules in 1927 as an explosive sales and service representative. In 1935 he was named special representative of the Contractors Division. Following military service he returned as special representative in the Contractors Division, becoming assistant manager in 1948 and manager in 1949.

The Jeffrey Manufacturing Company, Columbus, Ohio, has opened a branch office at Los Angeles. KEITH BEACHER, formerly with the San Francisco district office, will head the new branch.

Three service representatives have been added by the Allis-Chalmers Manufacturing Company, Construction Machinery Division Service Department, at the Training Center in Springfield, Ill. They are: T. V. HICKS, G. O. LANGUELL, and C. E. LOVE. All were formerly members of the Deerfield Works Service Department, and now serve as field service representatives, Training Center instructors, and service instructors on the company's mobile training units that provide field training to Allis-Chalmers dealer and customer service personnel throughout the United States and Canada.

Specify SANDVIK COROMANT ROPE-THREAD bits and steels

...for quick hand uncoupling!

No, it's not child's play, but the fact is you can uncouple Sandvik Coromant Rope-Thread bits and steels by hand! Smooth, shallow-depth, rounded threads with a pitch of just 2 turns per inch prevent binding. You'll have fewer thread failures too, compared with "saw-tooth" thread designs. What's more, only the threads are hardened, so you can re-thread steel sections without heat-treating. And, with faster uncoupling, you'll drill more feet per shift!

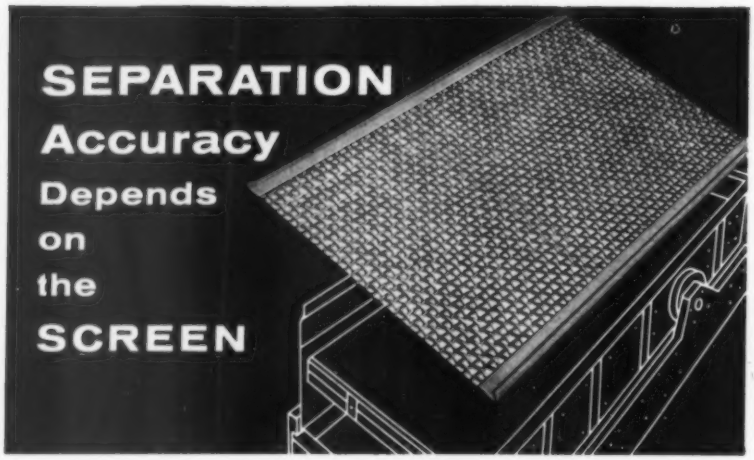
Coromant bits and steels have many other advantages, too: Better quality carbide (Sandvik is one of the largest manufacturers of carbide in the world)... better, more rigid steel... superior workmanship... all add up to above-average bit and rod life, up to double the footage between sharpenings, and straighter, cleaner holes.

Want proof? Easy! Call us and we'll arrange for a demonstration and test on your job. Write us today. Address: Dept. PQ-11.

Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375



● Accurate separation of any vibrating equipment depends upon the screen. High tonnage, reduced blindness and extra strength are a result of careful screen selection. Cleveland's years of manufacturing experience provide a wide range of accurately sized weaves for long, trouble-free life. Available in Cleloy and all commercial metals for all types of mechanical and electrical vibrating equipment. Exclusive hooked edge design reduces bending, slipping and screen distortion.

See our ad in PIT & QUARRY Yearbook

Send specifications today. Ask for a free copy of our vibrating screen bulletin.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3574 East 78th Street • Cleveland 5, Ohio • Telephone: Diamond 1-1832

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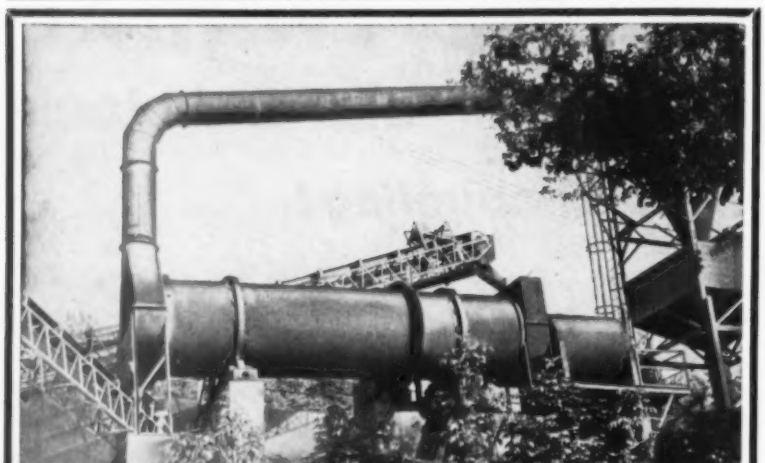


DRYERS • COOLERS • KILNS

This 7 ft. x 30 ft. Rotary Dryer removes excess moisture. Dryer is oil heated.

Over 60 years of experience and a thorough knowledge of raw materials and their properties have resulted in McDermott's ability to design and build for you the most efficient equipment for your specific needs. You'll save money on initial installation costs . . . and, more important, on maintenance costs.

write for free brochure
12 pages of diagrams, descriptions and on-the-job photographs to illustrate the scope of our work.

McDermott BROTHERS CO., Inc.
Allentown, Penna.
HEmlock 3-3231

Enter 204-B on card, page 173

F. T. RANDOLPH has been appointed manager of the J-M Fesco board plant at Rockdale, Ill. Mr. Randolph is an industrial engineer with 32 years of service with Johns-Manville.

Holding new positions which are part of a Johns-Manville program of expanded sales and service to the plaster, industrial insulations, and soil conditioner industries are LYLE BOLSTER, responsible for the sale of crude perlite ore to gypsum companies and perlite expanding plants throughout the United States; and KIRK HAZELTON, responsible for providing technical help in processing ore for expanded products. Both men will work out of the Joliet, Illinois plant.

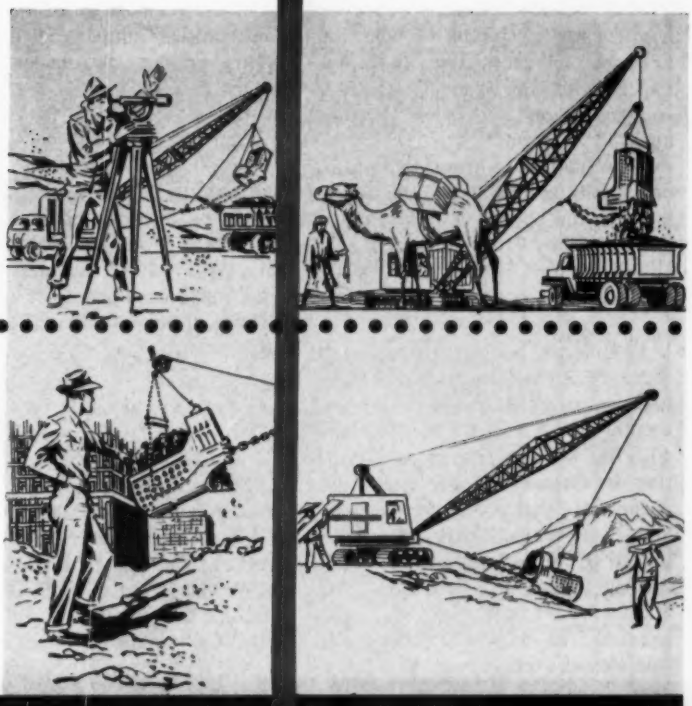
FRANCIS O. BOUFFORD, former western regional sales manager for Yale Materials Handling Division, The Yale & Towne Manufacturing Company, Philadelphia, Pa., has been appointed New York branch sales manager.

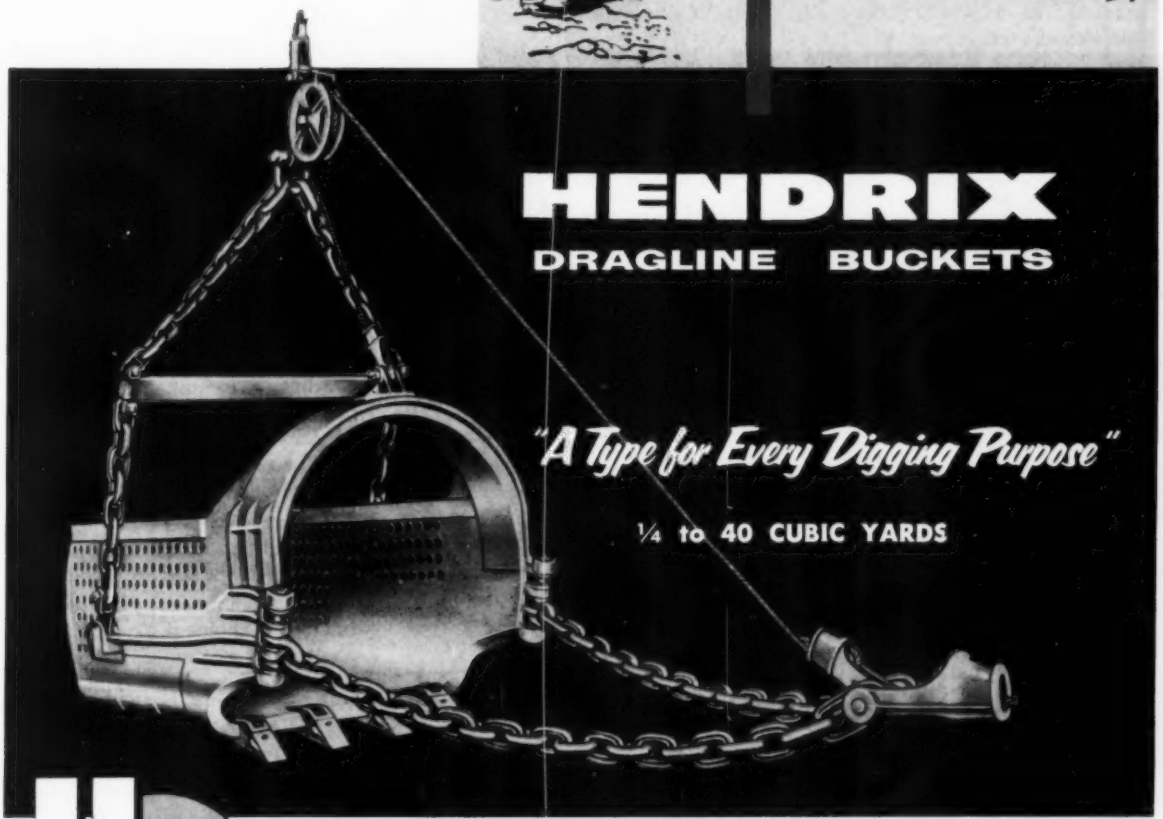
ELMER E. TWYMAN, senior vice-president of the Yale & Towne Manufacturing Company, New York, N. Y., has retired after 31 years with the firm. His responsibilities for the company's domestic and foreign materials handling equipment operations have been assigned to JOHN A. BALDINGER, who has been vice-president and general manager of the Yale Materials Handling Division in Philadelphia.

CLYDE R. DEAN, general sales manager of the Yale Materials Handling Division, succeeds Mr. Baldinger as general manager. Mr. Dean has had wide experience in both domestic and international operations since he entered the materials handling industry in 1938.

A $2,000,000 expansion program at Tyson Bearing Company, Massillon, Ohio, will enable the company to almost triple its capacity to produce tapered roller bearings for heavy equipment. The building project follows completion of two earlier plant expansions since the company became a division of SKF Industries, Incorporated, in July, 1957.

MATCHED
to the job.....
UNMATCHED
for service





HENDRIX
DRAGLINE BUCKETS

"A Type for Every Digging Purpose"

¼ to 40 CUBIC YARDS

Hendrix Lightweight DRAGLINE BUCKETS

All Hendrix Buckets available without perforations

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

BARRY T. LEITHEAD, president of Cluett, Peabody & Company, Incorporated, was elected to the board of directors of West Virginia Pulp and Paper Company. Mr. Leithead's company joined with West Virginia in 1958 to form Clupak, Incorporated, organized to license producers of Clupak stretchable paper, developed by the paper company from a patent held by Cluett, Peabody.

FRED ROSSI has been promoted to manager of The General Tire & Rubber Company's Boston division, succeeding WILLIAM F. MCNURNEY, who has been promoted to a position in General's retail stores department. Other promotions include WILLIAM WEEMS, who has been named assistant manager of truck tire sales, succeeding Fred Rossi; and HARRY V. PERKINS, who has been promoted to manager of truck tire sales for the company's San Francisco division.

FREDERICK C. SAMMONS, Los Angeles district manager of the General Refractories Company, died recently at his home in Los Angeles.

CLARENCE W. HAHN, who was made production manager of the Waukesha Motor Company, Waukesha, Wis., in 1957, has been given the additional responsibilities of supervising all manufacturing and shop departments.

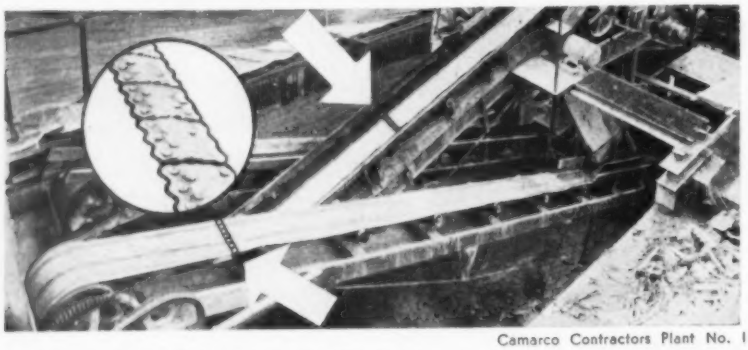
MARC B. ROJTMAN has resigned as president of J. I. Case Company. He was succeeded by WILLIAM J. GREDE. The change was made to relieve Mr. Rojtman from detail and routine administration and to free him for expansion operations at home and abroad, according to a statement by the new president.

The name of The Sight Feed Generator Company was changed to Rexarc, Incorporated, by vote of the stockholders recently. It was felt that the old name was too limiting to represent the varied welding line. The name of "Sight Feed Generator" will be preserved and referred to as a division of Rexarc, Incorporated.

EDWARD M. FALK, sales manager, The W. W. Sly Manufacturing Company, died unexpectedly on January 8, 1960. Mr. Falk, 51, had been associated for 22 years with the Cleveland manufacturer of dust control systems, industrial ovens, blast-cleaning equipment, and tumbling mills.

ANDREW W. SHEARER has been appointed a technical press representative in the public relations department of Atlas Powder Co. He will also serve as editor of *The Atlas Family*, company employee magazine.

"*We tried them all— then standardized on* CRESCENTS"



Camarco Contractors Plant No. 1

"Our conveyor belts take a terrific beating and only a rugged fastener will hold them. We found that CRESCENT plates did a superior job, and because of the speed with which they can be attached with CRESCENT self-clinching rivets, *WE CUT OUR DOWN TIME IN HALF!*"

NO HOLES TO BORE • A HAMMER IS ALL YOU NEED! • NO TOOLS NECESSARY

CRESCENT BELT FASTENER CO.

381 Fourth Ave., New York, N. Y.

TORONTO, CANADA BIRMINGHAM, ENGLAND

Distributors throughout the World

Enter 206 on card, page 173

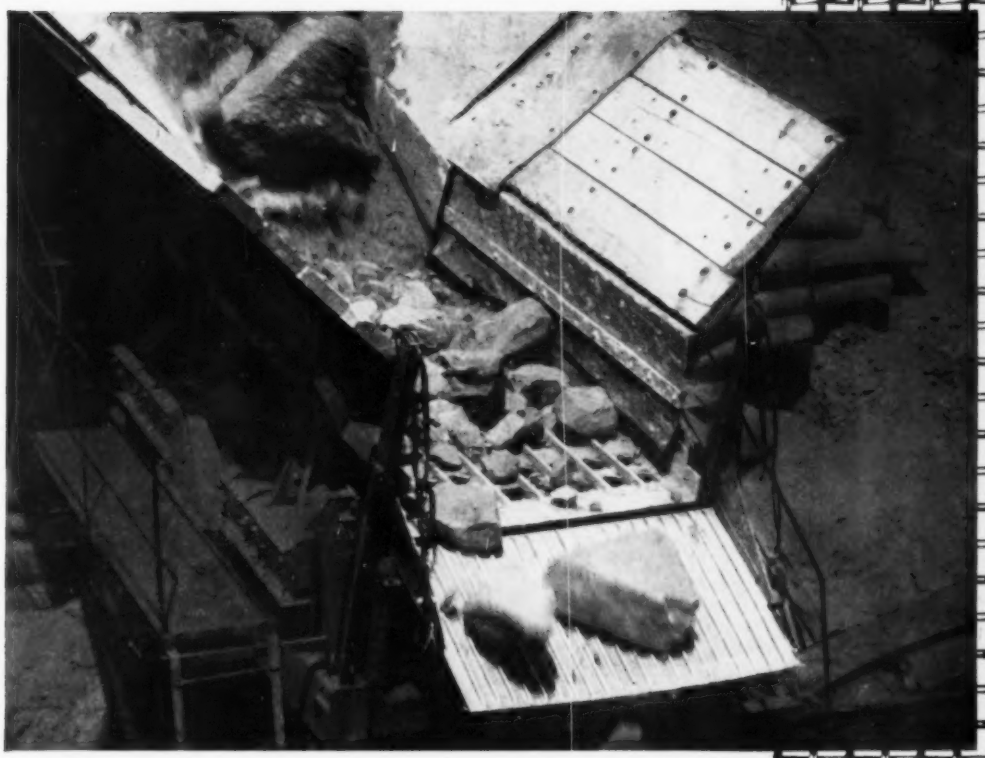
Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, announces the appointment of Arrow Contractors Equipment Company, 47th and S. Kedzie Avenue, Chicago 32, Illinois, as distributor of Lima shovels, cranes, draglines and pullshovels, in capacity from ½ to 8 cu. yd. and the Lima Roadpacker, self-propelled vibratory compactor.

Their territory covers three counties in the state of Indiana and twelve counties in the state of Illinois.

The appointment of Arrow Contractors Equipment Company, 47th and S. Kedzie Avenue, Chicago, Illinois, as distributor for Lima Austin-Western crushing, screening and washing equipment is also being announced.

Their territory covers two counties in the state of Indiana and twelve counties in the state of Illinois.

CHECK LISTING
of available
technical literature, p. 173.



When 4-foot rocks slam down, rugged TYLER design pays off

On this construction job, 14-ton truckloads of material are dumped down a chute to this Tyler Ty-Rock vibrating screen. It separates the finer materials, passes rip-rap for facing use.

After studying the requirements of this job, the Tyler sales engineer recommended a heavy duty Ty-Rock vibrating screen. This unit is rugged, and dynamically balanced so that all power is expended in effective separation of the material handled. It's proved a reliable performer on this project—takes giant rocks in stride—handles 600 tons per hour.

Tyler Screening Service offers you equipment perfectly matched to your job. Your Tyler representative has the experience and know-how to give you results—backed by the world's leading manufacturer of woven wire cloth, and of a full line of screening machines. Call Tyler and be sure.

WOVEN WIRE SCREENS • SCREENING MACHINERY • TESTING SIEVE EQUIPMENT

TYLER

The W. S. TYLER Company • *Cleveland 14, Ohio*

OFFICES: New York • Chicago • Boston • Philadelphia • Atlanta
Dallas • Los Angeles • San Francisco • Baltimore • Birmingham • Houston • Minneapolis
Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Limited,
St. Catharines, Ontario • OFFICE: Montreal

Fine Grinding for the NON-METALLICS INDUSTRY

RAYMOND MULTI-PURPOSE ROLLER MILL WITH WHIZZER AIR SEPARATION

TYPICAL PRODUCTS PULVERIZED ON RAYMOND ROLLER MILLS

LIMESTONE
DOLOMITE
GYPSUM
BARYTES
BAUXITE
CLAYS
PHOSPHATE ROCK
SULPHUR
CHEMICALS

For further details, refer to Raymond Roller Mill Catalog #79

Roller Mill Economy is a synonym for Raymond advancement in design and engineering. As a result, Raymond equipment is accepted by industry for quantity and quality production while maintaining record low costs.

In the non-metallics field, Raymond Mills do an outstanding job because of their ability to handle all grades and mixtures . . . to provide a range of capacities for large or small plants . . . and to produce uniform finished material to meet highest specifications.

- **Automatic dust-free operation with minimum attention**
- **Ease of fineness control by means of whizzer separation**
- **Minimum space requirements and flexibility of installation**
- **Removal of moisture where necessary by drying and grinding**

Whatever your grinding problem, get in touch with Raymond engineers for selection of your equipment and advice on special products.

COMBUSTION ENGINEERING, INC.

Raymond Division

1122 W. Blackhawk Street
CHICAGO 22, ILLINOIS

SALES OFFICES IN PRINCIPAL CITIES

Combustion Engineering-Superheater Ltd., Montreal, Canada

Crushers with *Gýrol*® Fluid Drive shrug off shock

On crushers, grinders, pulverizers, sizers, and conveyors, Gýrol Fluid Drive from American-Standard* Industrial Division transmits power through a vortex of oil to isolate damaging shock loads and torsional vibrations. Other features of Gýrol Fluid Drive are: smooth, stepless speed control and no-load starting of heavy-inertia loads. There are units available from 1 hp to 12,000 hp. Find out how your operations can benefit from efficient, dependable Gýrol Fluid Drive. Contact our nearest office today. They're located in all principal cities. American-Standard Industrial Division, Detroit 32, Michigan. In Canada: American-Standard Products (Canada) Limited, Toronto, Ontario.

*American-Standard and Standard® are trademarks of American Radiator & Standard Sanitary Corporation

AMERICAN-Standard
INDUSTRIAL DIVISION
AMERICAN BLOWER PRODUCTS • ROSS PRODUCTS • KEWANEE PRODUCTS

STARSTEEL
HEAVY DUTY **SPACE SCREENS**

This is why STARSTEEL screens top others in resistance to abrasion, fatigue, distortion—in some cases, last twice as long:

1 Specially alloyed high carbon wire is harder, tougher, more ductile

2 Tighter, more rigid weaving eliminates buckles and bulges

3 Perfectly formed edges and precision-applied hook strips make installation easier under higher tension, preserve accuracy of openings, reduce breakage

Insist on STARSTEEL screens—cut replacement cost and downtime, increase output. *Ask for catalog.*

QUICK SHIPMENT of all popular weaves, meshes, gauges

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

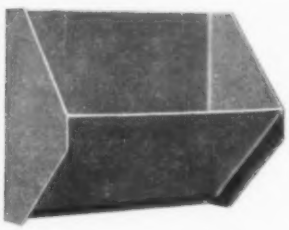
STAR WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.

Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

Enter 210-A on card, page 173

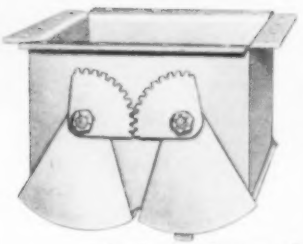
WHAT WERE YOUR CONVEYING / ELEVATING COSTS LAST MONTH?

Industries cut costs month after month with Standard Metal Equipment



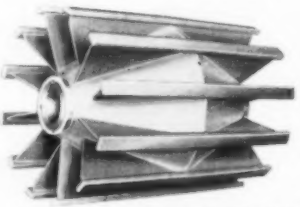
STANDARD METAL'S CONTINUOUS ELEVATOR BUCKET STYLE No. 2

This long-life bucket resists wear — delivers outstanding service and economy under severest conditions. This style is just one of the complete line of low-cost, rugged steel buckets manufactured by Standard Metal. Available in Salem, Style "A" and other continuous style buckets.



STANDARD METAL'S BIN GATES

Here's the all-steel, gear-operated Duplex Bin Gate for faster, easier material handling at minimum cost. Now supplied standard with twin bracket at bottom of gate, drilled to accommodate bolt for fulcrum lever. Single Bin Gates by Standard Metal also available.



STANDARD METAL'S WING-TYPE SELF-CLEANING PULLEY

Includes Taper-Lock Split Bushing to save time and trouble when mounting shaft. These pulleys are light in weight, yet their all-steel welded construction resists breaking, and delivers many years of trouble-free, low-cost service. Also available with solid hubs bored to specifications.

Contact us for full details and quotations on your particular needs in elevating and conveying equipment—for new installations or replacements. Ask for the catalog showing the complete Standard line.

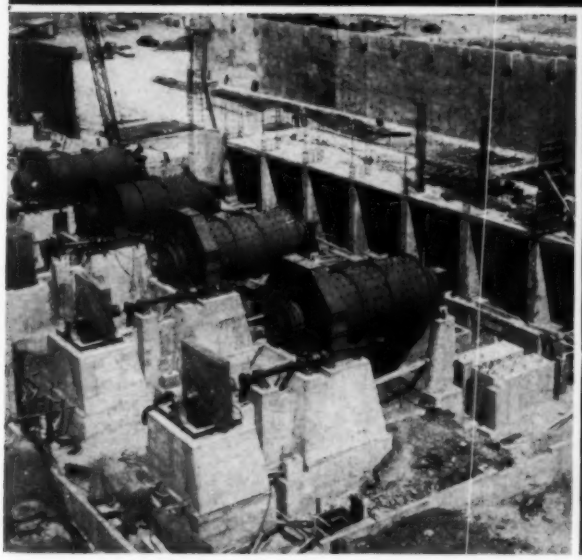
The Standard Metal M.F.G. Co. Since 1921

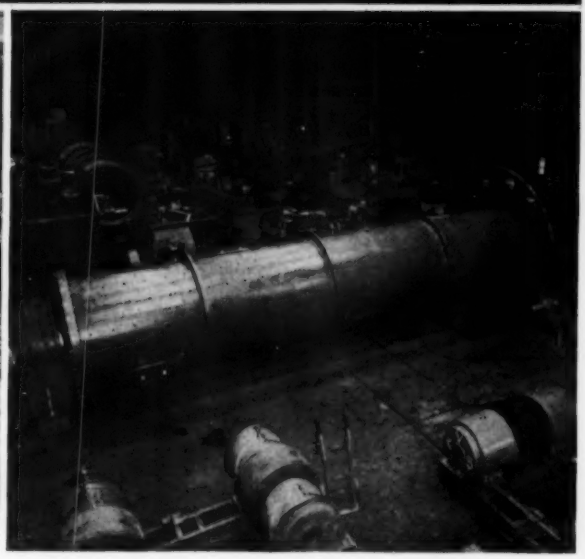
STANDARD METAL MFG. CO.
110 CENTER ST. MALINTA, OHIO

Enter 210-B on card, page 173

KENNEDY

GRINDING MILLS for the CEMENT INDUSTRY





The qualities which distinguish KENNEDY Mills are high capacity, dependable performance, low operating cost and minimum maintenance. KENNEDY Mills are in use all over the world, grinding cement raw materials and clinker and pulverizing coal for firing rotary kilns.

KENNEDY MILLS are available in all types and sizes ranging from long, multi-compartment mills to shorter, large diameter mills for closed circuit grinding as mechanical discharge type or air-swept.

KENNEDY MILLS are available with a choice of drives:—the renowned KENNEDY enclosed integral gear drive; with ring gear and pinion drive, either spur or helical; or with separate reducer drive.

KENNEDY MILLS used as a part of the patented KENNEDY Air-Swept Grinding System simultaneously grind and dry raw materials or coal, in closed circuit with non-mechanical air separators for kiln feed or kiln firing.

All KENNEDY MILLS are built in our own completely equipped plant. Shell flanges are machined simultaneously on special mammoth lathes for perfect alignment.

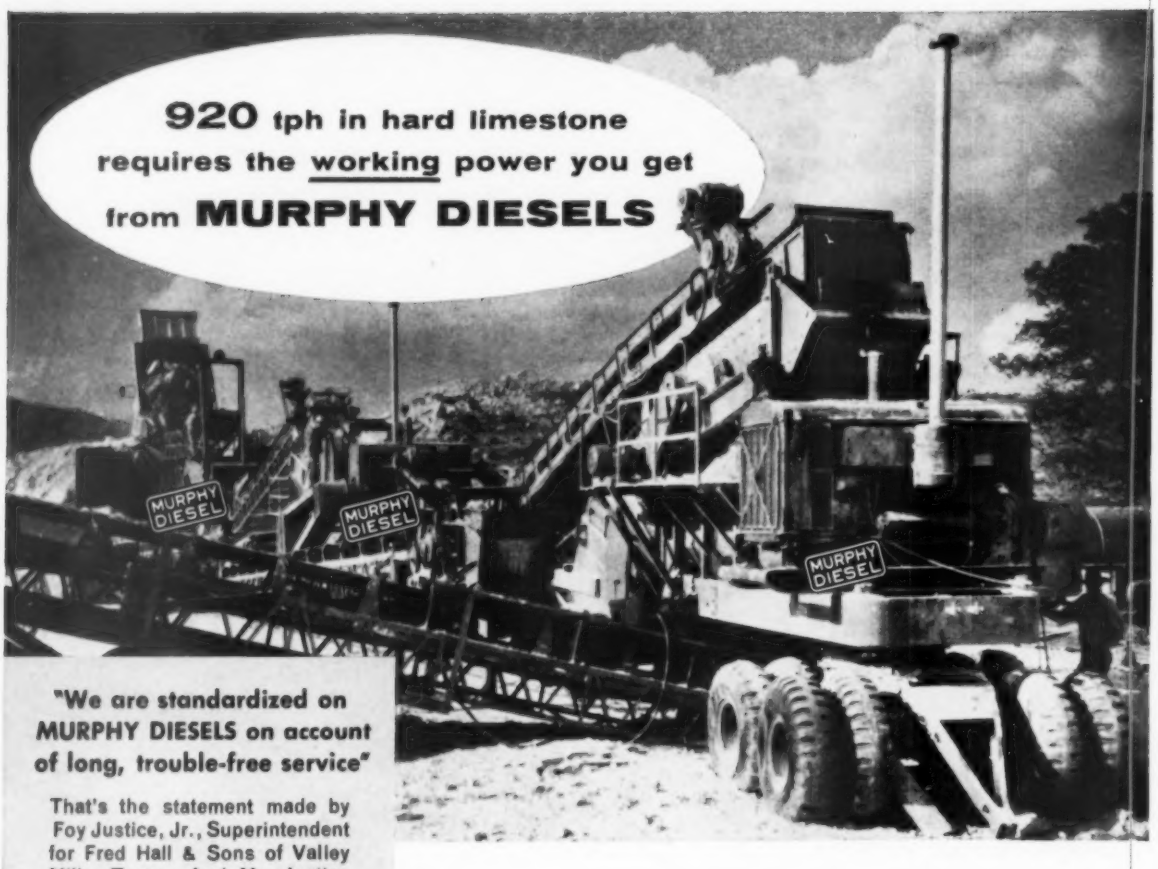
Ask a KENNEDY *engineer to show you the economies possible with a* KENNEDY *Mill.*

KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Kilns • Dryers • Screens • Mechanical & Pneumatic Conveyors • Complete Crushing, Lime & Cement Plant. KENNEDY Research and Testing Service



"We are standardized on MURPHY DIESELS on account of long, trouble-free service"

That's the statement made by Foy Justice, Jr., Superintendent for Fred Hall & Sons of Valley Mills, Texas. And Mr. Justice has had plenty of experience with the performance of Murphy Diesels . . . they have 13 Murphys powering their Pioneer crushing plants and Northwest shovels to put more power into the job. On the job shown above, power for the crushing units is furnished by two 225 HP (continuous) Murphys, a 177 HP (continuous) Murphy, and a 150 KW Murphy Diesel Generator Set. They are producing crushed limestone for rebuilding U. S. 190 between Belton and Killeen, Texas.

MURPHY DIESEL

Production of 800 to over 900 tons of hard Edwards limestone per hour is no accident! It is good management on the part of Texas contractor Fred Hall & Sons in selecting the right crushing plants *and putting Murphy Diesel Power into the job.* These are the engines that give you the kind of usable, hard-working power needed for crushing.

Murphy Diesels provide good lugging power because of high rising torque to help keep your equipment running at the right operating speed for efficient production and more profit. They give you steady production shift after shift with lowest engine maintenance costs, plus the economy and dependability of "true diesel" operation. Your Murphy Diesel Dealer has the facts. See him today.

428-RO

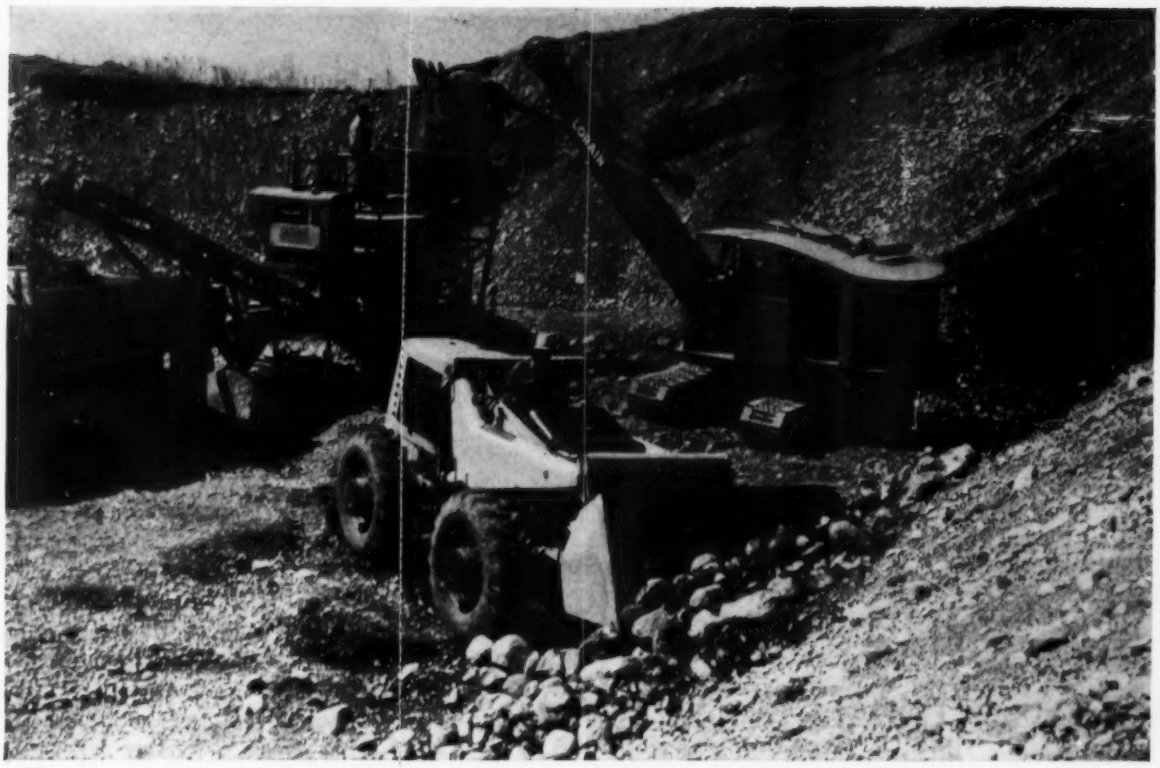
PUTS MORE POWER INTO THE JOB

MP Series Murphy Diesel engines and power units are available in sizes from 105 to 320 HP with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 188 KW.

MURPHY DIESEL COMPANY

5307 W. Burnham St. • Milwaukee 19, Wis.

SALES—PARTS—SERVICE throughout the Nation



HIGH PRODUCTION PITMATES
Lorain-26 Shovel and Moto-Loader boost gravel plant output

Supplying a steady flow of gravel for road reconstruction is no problem for this high-capacity Lorain team. Jefferson County Highway Dept. of Watertown, New York, uses its heavy-duty ¾-yard Lorain-26 to feed their crushing plant. Husky construction and simplified controls of the "26" make it easy to handle this 50,000-yard job.

The "26" has the power, stamina and speed for toughest digging . . . converts to hoe, crane, dragline or clamshell. Two-lever "Joy-Stick" power controls are available for combined operations. Choice of three crawlers.

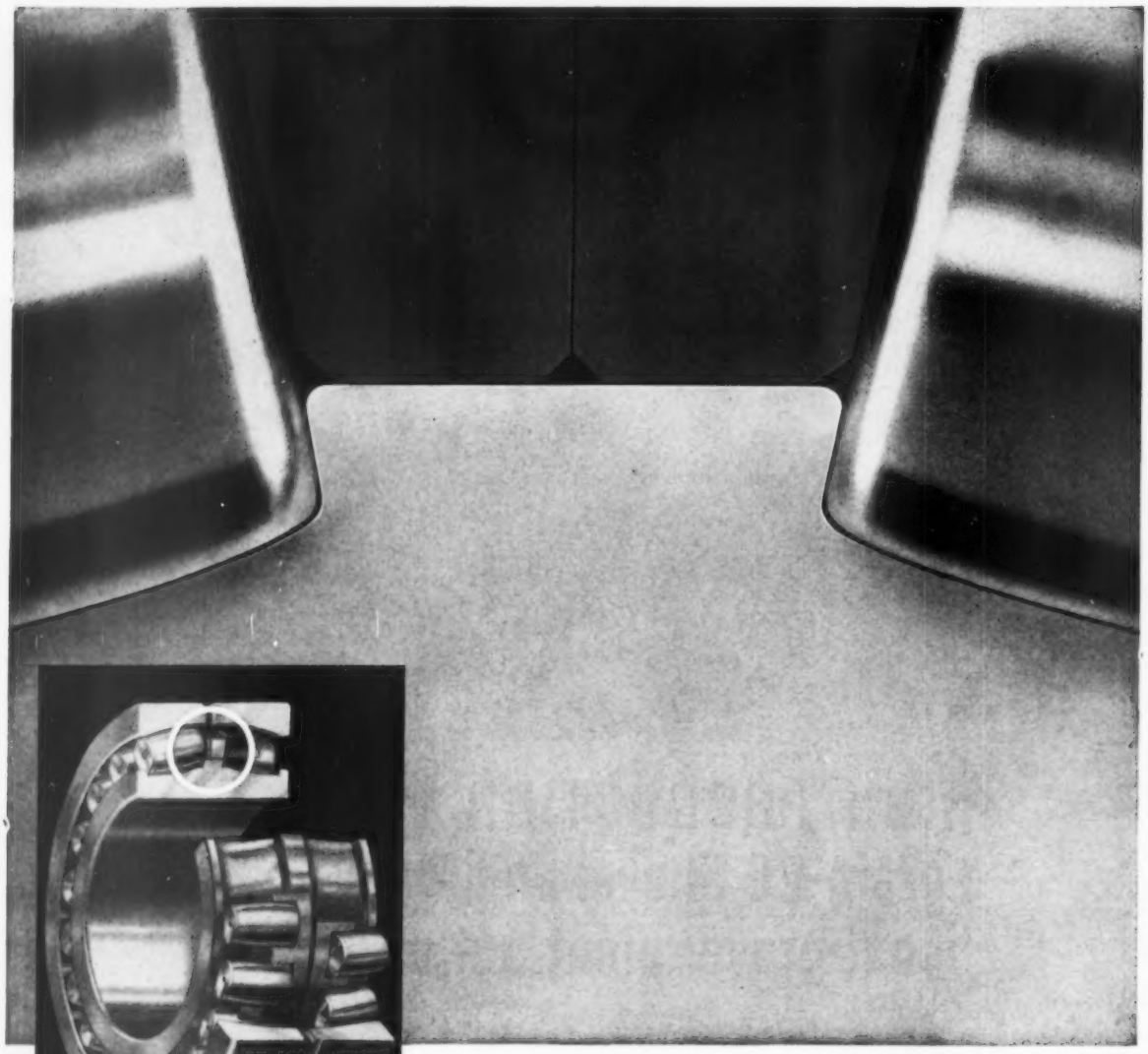
Moto-Loader serves as cleanup unit as it loads out rocks that are too large for the crusher and moves them to spoil piles. With a carrying capacity of 7,000 pounds, the ML-157 has the balanced design for big production.

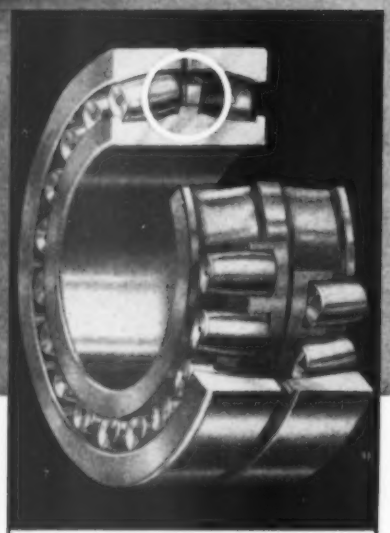
Power balance matches hydraulic capacity with engine size and transmission of power to the wheels . . . **Control balance** features Lorain's One-Foot Travel Control that frees operator's hands for steering and other operations . . . **Weight balance** is provided by a low center of gravity for ground-hugging, no-bounce travel.

It all adds up to faster handling to keep trucks on the move. For details, see your Lorain distributor.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN® ON THE MOVE





TORRINGTON
Spherical Roller Bearings Offer:

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Send for new Torrington Spherical Roller Bearing Catalog #258.

Keystone of Stability!

The integral center guide flange of the *Torrington* Spherical Roller Bearing provides *positive* roller guidance—the one best way to insure operating stability under radial and thrust loads.

Center guide flange surfaces and roller ends are ground to a common spherical radius. The asymmetrical roller seeks this flange under load, bearing lightly but constantly against it. Roller wobble and skewing are eliminated, and stress concentrations leading to early failure are avoided. Bearing operation is cooler, quieter and smoother.

The integral guide flange is adapted from the same principle used in the design of Torrington Tapered Roller Bearings. It is an engineering refinement, based on experience in all types of applications, that insures outstanding performance in your equipment. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

Every Basic Type of Anti-friction Bearing

SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

NOW! A SCREEN WITH A

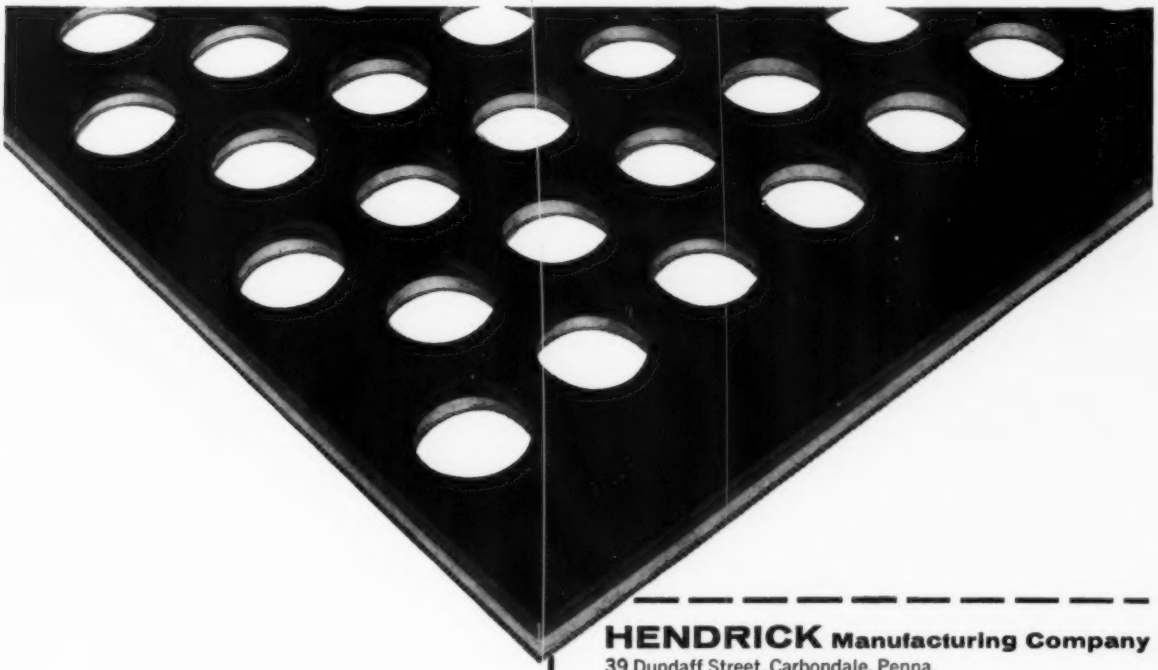
rubber bumper

HENDRICK RUBBER CLAD PERFORATED METAL is now available with a specially designed rubber covering. Ideal where extreme abrasion is a problem, rubber clad Hendrick Perforated Screens assure far less plate wear. Large chunks of ore, coal or stone hit the screen with a fully cushioned shock . . . the rubber coating also takes the brunt of wear by protecting the steel plate underneath. The rubber laminate is bonded to steel by a new adhesive and vulcanized under controlled heat.

For more details contact your local Hendrick representative or mail in the coupon direct.

HENDRICK Manufacturing Company
Carbondale, Pennsylvania

PERFORATED METAL SCREENS • WEDGE WIRE SCREENS • CASCADE WEDGE WIRE SCREENS
WEDGE SLOT SCREENS • RUBBER CLAD PERFORATED SCREENS • FLANGED LIP SCREENS
FLIGHTS • SHAKER AND CONVEYOR TROUGHS.



HENDRICK Manufacturing Company
39 Dundaff Street, Carbondale, Penna.

Gentlemen: I would like to learn more about Hendrick Rubber Clad Perforated Metal Screens.

☐ Please have representative call.
☐ Please send FREE literature.

NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

Compact, portable Victormatic weighs about 100 lbs., measures 10" x 18" x 20", is amazingly easy to operate.

VICTORMATIC is a portable, semi-automatic, sensibly priced and specifically engineered for hardfacing with continuous coil, fabricated-tube wire. You buy it for less than a welder's monthly wage and it will pay for itself in a matter of weeks by . . .

- boosting production. Handles hardfacing jobs from build-up to finish overlays, semi-automatically.
- eliminating stub-end waste and rod changing time.
- reducing costly equipment downtime.

VICTORMATIC ties in, *in minutes,* with almost any standard 300 amp. welder — rectifier type, gas, or electric. It is ideal for field use with gas driven, portable welder. Operates as full-automatic when coupled with suitable positioning device. Adaptable for submerged arc and drawn wire welding.

Ask your Victor dealer for a demonstration today . . . see for yourself how much faster and cheaper you can hardface with a VICTORMATIC.

Profitable dealerships open; inquire now!

VICTOR for hardfacing

For Top Performance use Victor Automatic and Semi-Automatic Wires. Complete line of continuous-coil wires for hardfacing and build-up; give you high deposition rate and notably low spatter loss. Victor guarantees consistent uniformity from coil to coil, regardless of lot date. For welding and wear, compare Victor wire with any other wire — on your job.

VICTOR EQUIPMENT COMPANY

Alloy Rod & Metal Division

H-64

13808 E. Imperial Highway, Norwalk, California . . . . Wakita, Oklahoma

Traylor-Made . . . means rugged dependability in heavy machinery. 60 years of industrial engineering experience goes into our ROTARY KILNS, PRIMARY and SECONDARY GYRATORY CRUSHERS, JAW CRUSHERS, APRON FEEDERS, BALL MILLS.

write for bulletins, giving complete information.

TRAYLOR ENGINEERING & MANUFACTURING
DIVISION OF FULLER COMPANY
1525 MILL STREET, ALLENTOWN, PA.

A121

For a money-saving balance

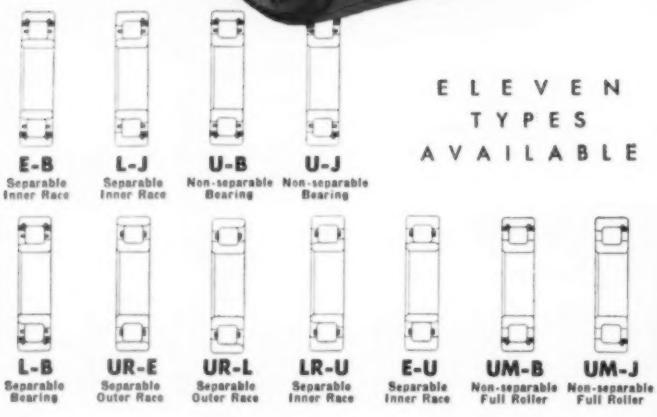
between maximum performance and moderate cost . . .

ROLLWAY Tru-Rol® BEARINGS

Give you more for your bearing dollar

For those hundreds of in-between applications where performance requirements are more exacting than those provided by the ordinary commercial bearing, but where maximum precision would be unneeded precision — specify Tru-Rol for the job.

Tru-Rol Bearings provide above-commercial-grade efficiency . . . at worthwhile savings in cost. Internal clearances are closely controlled. Rollers are equally spaced to eliminate out-of-balance vibration. Each roller is crowned to distribute the load evenly along the full length of the roller. Eleven types available in single and double width bearings, in stamped steel retainer, segmented retainer or full roller construction.



ELEVEN TYPES AVAILABLE

Ask your nearby Rollway Service Engineer to detail the quality you *should be getting* in your "commercial grade" bearings. Or write for the Rollway Tru-Rol catalog showing the full line, and capacity and size ranges. ROLLWAY BEARING COMPANY, INC., Syracuse, N. Y.

ROLLWAY® BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ENGINEERING OFFICES: Syracuse • Chicago • Toronto • Cleveland • Seattle • San Francisco • Boston • Detroit • Pittsburgh • Houston • Philadelphia • Los Angeles

LIMA

Fast, economical way to scoop...

Swing and load bulk materials; no waste motion!

New 5-yd. Lima Loader works at high speed standing still

The Lima loader digs, scoops, swings and loads in a complete circle at full speed from a stationary location. It is designed to give you top loader production with shovel efficiency.

The loader is actually five machines in one! Mounted on basic Type 64 crawler base, it is easily converted in the field to crane, shovel, dragline or pull shovel. Its 5-yd. bucket also serves as excavator or materials handler.

From removable bucket teeth to crawler treads, the new 5-yd. Lima Loader is a quality machine, built to give years of dependable high production with low maintenance requirements. If you handle gravel, stone, coal, dirt, chemicals or other bulk materials in your operations, a Lima loader will do the job faster and more economically than other conventional loading equipment.

Why not look into the advantages of a Lima Loader? Your nearby Lima distributor has interesting facts and figures for you. Call on him, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corp., Lima, Ohio.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

LIMA Construction Equipment Division, Lima, Ohio

BALDWIN · LIMA · HAMILTON

6020

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

BALDWIN BLH LIMA-HAMILTON

ONLY CROSBY-LAUGHLIN HOOKS

DO WHAT THEY SAY
SAY WHAT THEY DO

Load-Rated®

- GUARANTEED NOT TO BREAK
- WIDEST CAPACITY RANGE
- EASILY CONVERTED TO SAFETY HOOK

Ask your distributor for complete line catalog

CROSBY-LAUGHLIN *Division*

FT. WAYNE, INDIANA

Forged Fittings For Wire Rope and Chain

Enter 220-A on card, page 173

Winslow TRUCK SCALES

PIT AND PITLESS TYPES

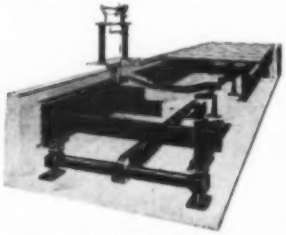
CABINET DIAL

Weight indication available includes ball bearing poise weighbeams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
PHONE NORTH 1231

TYPE CS—PORTABLE—PITLESS

Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18' x 9' thru 40' x 10', wood or steel deck.



TYPE S—PIT SCALE

Type S scales, pit installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform sizes 22' x 9' thru 60' x 10' for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.

4830 NORTH 25TH ST. **TERRE HAUTE, IND.**

Enter 220-B on card, page 173

CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

Enter 220-C on card, page 173

DEPENDABLE
FOR 60 YEARS

Woven Wire
ALLOY
SCREENS

TWIN CITY IRON & WIRE CO.
St. Paul, Minnesota

Enter 220-D on card, page 173

Four reasons why this NI-HARD cast drop ball is a smash hit!

This Ni-Hard* cast iron drop ball is dedicated to a long life "on the rocks." Its service record – and that of other GIW Ni-Hard drop balls produced by the Special Products Division of Georgia Iron Works, Augusta, Ga. – has proved to be *four* times longer than that of any other type ball. In fact, most GIW Ni-Hard balls have replaced forged steel balls. Here are four reasons why:

• **Design.** Notice the design of the ball. It has been quoted to be so well balanced that the operator is able to lift and drop the ball more times per shift. One operator stated that his overtime was eliminated when he started using Ni-Hard balls.

• **Abrasion resistance.** Ni-Hard is one of the hardest commercial products of the iron foundry, possessing outstanding abrasion resistance. This important property enables Ni-Hard balls to withstand the severest wear of the hardest rocks.

• **Strength and toughness.** In addition to abrasion resistance Ni-Hard drop balls are tough enough and strong enough to withstand impact in this most demanding operation. They resist breaking or chipping.

• **Economy.** Only a Ni-Hard *cast* drop ball could be economically produced to take advantage of the money-saving features mentioned above. And, of course, the long service life of Ni-Hard drop balls means greater operating economy.

Put these Ni-Hard advantages to work for you. Next time you buy drop balls, get in touch with a Ni-Hard producer. There's one near you. If you don't have his name, write Inco for a list of authorized Ni-Hard producers.

*Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.

NI-HARD

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

NOW-A CONVEYOR IDLER PROVIDING TRUE CATENARY SUSPENSION FOR THE BELT...

S-A FLEXIROLL®

CATENARY CARRIERS FOR BELT CONVEYORS

AVAILABLE FOR 18", 20", 24", 30" & 36" WIDTHS

The STEPHENS-ADAMSON "FLEXIROLL" Catenary Carrier features a "dead-shaft" roller assembly which eliminates the problem of cable breakage common with catenary idlers but provides full flexibility for natural troughing action. The "FLEXIROLL" Carrier is immune to punishing corrosive atmosphere, extreme abrasive service and sticky or hard to handle materials — greater conveyor efficiency and less maintenance is assured.

S-A

WRITE FOR BULLETIN 260

STANDARD PRODUCTS DIVISION
STEPHENS-ADAMSON MFG. CO.
20 RIDGEWAY AVENUE • AURORA, ILLINOIS

PLANTS LOCATED IN: LOS ANGELES, CALIFORNIA
CLARKSDALE, MISSISSIPPI • BELLEVILLE, ONTARIO

Enter 222-A on card, page 173

COLUMBIA
ARMOR-TOUGH
BUCKET & SHOVEL PARTS
LAST LONGER

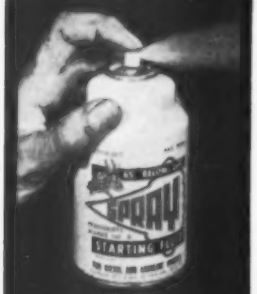
They last longer because Columbia Armor-Tough manganese steel parts grow tougher and tougher under impact . . . because Columbia puts more metal where it is needed most, where rock meets steel. Where the going is toughest Columbia Bucket and Shovel parts are your best investment. Ask any Columbia customer.

Get the full story on Columbia Armor-Tough Bucket and Shovel Parts.
WRITE for Bulletin #1067.

Columbia

COLUMBIA STEEL CASTING CO., INC.
933 N.W. Johnson, Portland 9, Oregon

Enter 222-C on card, page 173



START ENGINES EVERY DAY WITH SPRAY...

STARTING FLUID FOR DIESEL & GASOLINE ENGINES

Get more starts, quicker starts, at lower cost with SPRAY STARTING FLUID. Both the fluid and propellent burn . . . there's no waste! Each pressurized can contains enough fluid for many starts . . . starts that will sustain combustion until a smooth running engine can take over. Our greater supply of "vapor pressure" at all temperatures, atomized at a high initial rate, shortens cranking and warm up time, reduces dilution, prevents electrical and starting system wear, saves wasted man hours and equipment down-time. SPRAY is atomized for safe application and quantity control . . . use only as much as the engine requires. Field-proven SPRAY STARTING FLUID will start the toughest engine down to 65° below zero . . . but for year 'round economy start engines every day with SPRAY! Sold through automotive jobbers everywhere.

Ask about INSTNSTART closed system starting.

Insist on the can with the "balky donkey" trademark.

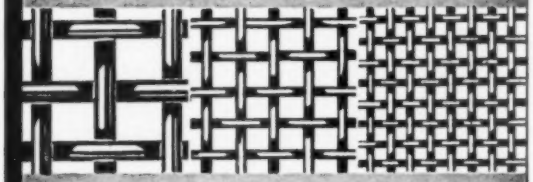
SPRAY PRODUCTS CORPORATION
P. O. Box 844 • Camden 1, New Jersey

Enter 222-B on card, page 173

STRONG AS ARMOR

NAT-ALOY

Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy. Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

WE OFFER NOW... SUPER NAT-ALOY
OIL TEMPERED WOVEN WIRE CLOTH
★ GREATER RESISTANCE TO ABRASION
★ MORE TONNAGE AT LOWER COST
★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

Enter 222-D on card, page 173

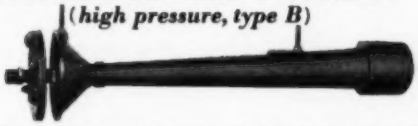
DFC BURNERS

Simple, Rugged, Low Cost

37 DFC Burners engineered for easy, low cost, maintenance-free operation, through long years of hard use. Atmospheric, high and low pressure inspirator, portable, tunnel, gas burners, gas-air mixers, oil burners and blowers. 80 years of burner experience...if you've got a burner problem, let us help you solve it.

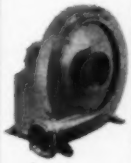
INSPIRATOR GAS BURNERS

(high pressure, type B)



Applications: Designed for use with natural or manufactured gas under **2 to 25 PSI.** Gives operational economy at low initial investment for boilers, dryers, heaters, incinerators, industrial furnaces, kilns, petroleum processing equipment and roasters. Nine sizes, from 80 to 24,000 cubic feet of 1,000 BTU gas per hour under pressures of 2 to 25 PSI.

Auto-Ratio Proportioning Oil Burner: Automatically maintains accurate air-oil ratio over entire range. Remarkable turn down ratio—up to 20 to 1. For dryers, heaters, industrial furnaces, kilns and roasters.



Centrifugal Motor Blowers: Low pressure blowers with double inlet and 16-oz. positive pressure series with single inlet, used as source of combustion air for industrial burner systems on boilers, dryers, kilns, industrial furnaces, petroleum processing equipment and roasters.

There's a DFC Burner to meet your requirements

DFO-2A

CALL OR WRITE FOR FULL INFORMATION

Denver Fire Clay Company

3033 Blake Street, Denver 17, Colorado

Please send me further information on your full line of Industrial Burners.

NAME.....

COMPANY.....

ADDRESS.....

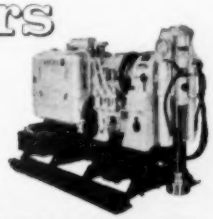
CITY AND STATE.....

Enter 223-A on card, page 173

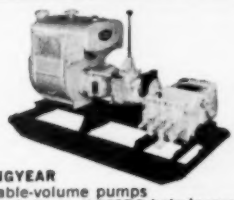
Longyear equipment saves exploration dollars

YOUR CREWS CARRY OUT drilling programs *faster* equipped with Longyear core drills. Longyear unitized drill rigs like this one slash moving and set-up time and increase operator efficiency. This Jeep rig consists of a powerful, gasoline-driven Longyear "24" diamond core drill, pump, and truss-type steel mast. Capacity is 675 feet with AW rods. Cab-over-engine Jeep and has 4-wheel drive able to move across roughest terrain.

ADV. 149



DRILL DEEP HOLES efficiently with a Longyear "44", a high-capacity drill throughout. The heavy duty planetary hoist has ample hoisting and braking power. NW twin hydraulic swivel head. Capacity: 3000 feet of AW rod. Skid or truck mounted.



LONGYEAR variable-volume pumps like this 5-speed 520RQ **help increase footage, bit life and core recovery.** The driller can instantly adjust volume and pressure over wide range . . . and pump into a closed circuit at every stage.

Longyear

E. J. Longyear Company, Minneapolis 2, Minnesota
Canadian Longyear Ltd., North Bay, Ontario
Longyear et Cie, Paris • Longyear N. V., The Hague

Enter 223-B on card, page 173

FILTER BAGS? WE KNOW MOST (NOT ALL)* OF THE ANSWERS...

As one of the world's leading manufacturers of industrial textiles, Albany Felt Company is in the best possible position to analyze your filter bag needs — and meet them effectively and economically. Since we can furnish any fiber, in any fabric, our recommendations are completely impartial.

It pays, in every sense of the word, to call in the company that is:

1. **unrivaled in research and manufacturing facilities**
2. **the developer of many new filtration ideas**
3. **a start-to-finish producer of almost every type of filter bag for every purpose, in every industrial field**
4. **a pioneer in needled fabrics for reverse-air units**

Albany Felt Company's facilities offer prompt, efficient service anywhere on the North American continent. Your inquiries are invited.

ALBANY FELT COMPANY
INDUSTRIAL FABRICS DIVISION
MAIN OFFICE AND PLANT: ALBANY 1, N. Y.

** our laboratories are working toward knowing ALL there is to know!*

ATTACH THIS COUPON TO YOUR LETTERHEAD — MAIL IT TODAY

ALBANY FELT COMPANY
INDUSTRIAL FABRICS DIVISION
ALBANY 1, N. Y.

☐ Please send us your latest Filter Bag bulletin.

☐ Have your representative call to supply us with a free, scientific analysis of our filter fabric requirements.

Enter 224-A on card, page 173

for better washing... dust control... concrete curing

SPRAY NOZZLES

from Spraying Systems Co.

- **complete choice of types and capacities to fit your job**
- **greater efficiency with minimum volume of water**

Proper distribution and impact for washing . . . or proper atomization for dust control and concrete curing without unnecessary wetting . . . these are just some of the advantages of having a complete choice of spray nozzle types and sizes to fit your job. For complete information write for Catalog 24.

SPRAYING SYSTEMS CO.
3224 RANDOLPH STREET
BELLWOOD, ILLINOIS

Enter 224-B on card, page 173

USED EQUIPMENT?

YOU CAN BUY OR SELL IT
BETTER THAN ANYWHERE ELSE
IN PIT & QUARRY'S
Broadcast Section

SEE PAGE 227

PLATEGRIP

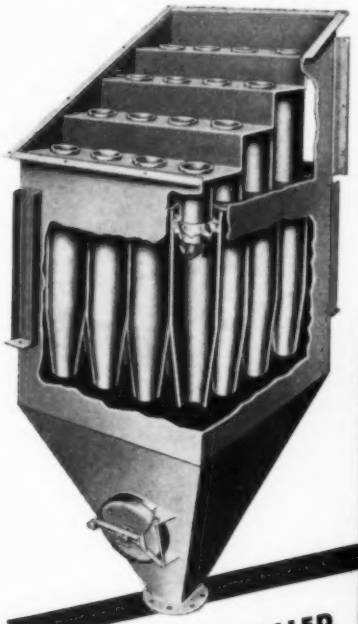
PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.
5394 Northwest Highway, CHICAGO 30, U. S. A.

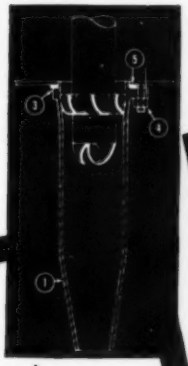
Enter 224-C on card, page 173

13 BIG REASONS WHY MULTICLONE DUST COLLECTORS



✔ COST LESS TO MAINTAIN...
✔ ARE FAR SIMPLER TO SERVICE!

When you buy dust collection equipment, don't stop with a comparison of *initial* cost only. Compare also the costs and simplicity of keeping your dust collector at top-notch efficiency *throughout the years.* To the outstanding advantages of Multiclone's unique operating features, add the low cost and easy maintenance of this equipment and you'll see why Multiclones are the leading choice wherever *centrifugal* types of dust collectors are the most practical solution.



EASILY INSTALLED COLLECTING TUBES

1. **CAST IRON TUBES** assure long wear!
2. **SPECIAL ALLOY TUBES** (FBA Inco #40, Chromehard and Ni-Hard) can be supplied where high temperatures or severe erosion are problems!
3. **TUBES ARE PRECISION-CAST** for exact fit into tube sheet. Tube lip protects sealing gasket!
4. **TIGHT LEAKPROOF FIT** of each tube is maintained indefinitely by special lock nuts!
5. **GAS-TIGHT JOINT** between tube sheet and each tube is assured by special gasket. Joint can be easily renewed when replacing tube!

PRECISION CAST VANES!

6. **CAST IRON VANES** resist erosion!
7. **SPECIAL ALLOY VANES** (FBA Inco #40, Chromehard and Ni-Hard) can be supplied where high temperatures or severe erosion are problems!
8. **VANES ARE EASILY INSTALLED** by simply dropping new ones into place when changing collecting tubes!
9. **EXACT FIT OF EACH VANE** in the tapered collecting tube prevents erosive "blow-by"!
10. **CAPACITY AND EFFICIENCY** of the unit can be quickly altered by simply changing vanes. Assures easy adaptability to new operating requirements—big savings in plant modernization programs!
11. **SPIROVANES** (energy recovery devices) may easily be added to outlet tubes of existing installations to increase capacity or reduce pressure drop!

Plus These Important Advantages...

12. **CUBIC SHAPE** of Multiclone is easier to install and insulate — and requires only ONE simple inlet and outlet duct!
13. **BACKED BY OVER 3300 INSTALLATIONS** serving a wide cross-section of industry, each Multiclone benefits from the unequalled "know-how" gained during Western Precipitation's half-century of leadership in the highly-technical field of modern fly ash collection!

Compare the above advantages with any competitive equipment and you'll readily see why Multiclones are the logical choice for *your particular* operations, too. There's a Multiclone representative near you who will gladly supply further details to fit your individual requirements. No obligation, of course!

Send for descriptive literature on Multiclone equipment.

Only WP has All 6

1. COTTRELL Electrical Precipitators
2. MULTICLONE Mechanical Collectors
3. CMP Combination Units
4. DUALAIRE Jet-Cleaned Filters
5. THERM-O-FLEX Hi-Temp Filters
6. TURBULAIRE-DOYLE Scrubbers

Also: HOLO-FLITE Processors
HI-TURBIANT Heaters

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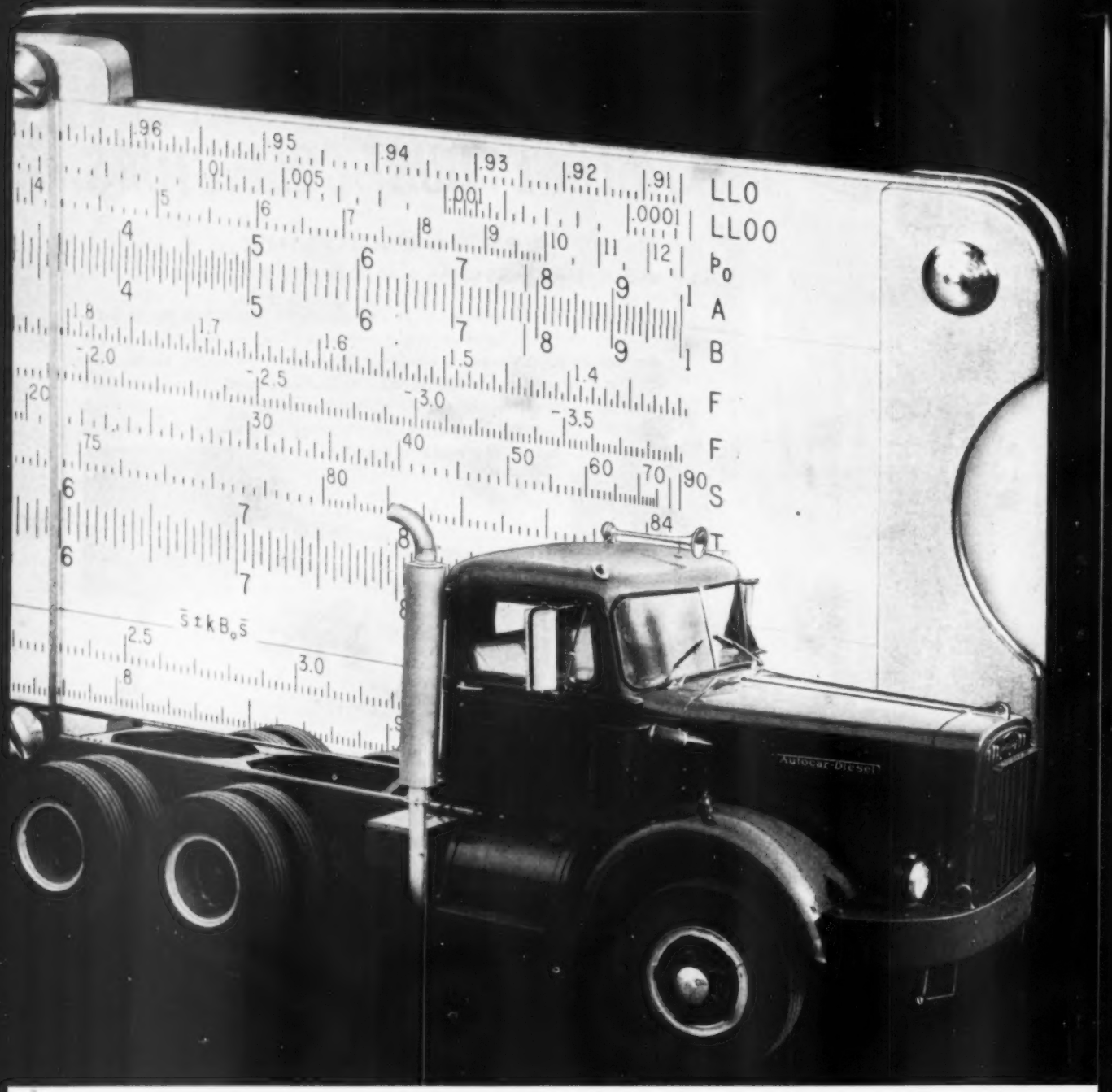
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries
LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9



Only the "World's Finest" is fully custom-engineered to your order

Nothing less than an Autocar can ever give the same owner-satisfaction as an Autocar itself. One reason is that every Autocar is fully custom-engineered and precision-built to do its assigned job with utmost efficiency. Long experience, advanced engineering and flexible manufacture produce just the truck, at a reasonable cost, that will earn the most for you.

The true value of an Autocar lies in the work it will do. In today's truck economics, you can't afford to take less.

Autocar
"World's Finest"

DIVISION OF
THE WHITE MOTOR COMPANY
EXTON, PA.

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$10.50 per column inch. Lower rates for larger space used and/or on a contract basis.

Write for rate card.

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20th of month preceding date of publication.

Used equipment, employment and professional ads only are eligible for classified advertising rates.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

CHIEF ENGINEER FOR CEMENT PLANT

We are looking for a man who is thoroughly familiar with most modern cement plant machinery and equipment to supervise program of expansion. This is an outstanding opportunity for a man who can take complete charge of all engineering and construction in connection with new and growing Eastern cement company.

Salary plus stock option.

College graduate preferred. Age 30-50. Must be forceful and have proven record of accomplishment.

Box No. PQ-317-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

DISTRICT SALES ENGINEER

Prominent manufacturer of crusher and process machinery has challenging position for Sales and Service Representative with excellent opportunity for advancement. Must have minimum of 5 years heavy machinery sales experience in mining, crushed stone, sand and gravel, or cement industries. Prefer technical background in Mechanical, Metallurgical, or Mining Engineering.

Write stating age, education, experience, present employment and salary requirements. Replies strictly confidential.

Box No. PQ-319-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

QUARRY SUPERINTENDENT

Plant Manager—Age 47, 25 years experience in all phases of crushed stone production. Specification Stone, Mineral Filler, Ready Mix Concrete Operations. Resumé on request.

Box No. PQ-311-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

WANTED

8-yr. old transit-mix concrete business with two efficient plants is interested in one of the following: 1. An outright purchaser of the complete business. 2. An investor interested in working all or partially. 3. A partial ownership investor who wants to retire and live in a beautiful area with a moderate climate. Business is located in fast growing area with diversified economy and future great business potential.

Box No. PQ-324-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

Chemical, Mechanical, and Electrical Engineers and Chemists. Ages 25—35 preferred. Responsible duties leading to managerial positions with multi-plant cement company. Give education, background, and salary expected. Replies confidential.

Box No. PQ-312-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

WANTED

Experienced Cement Plant Chemist. A growing western cement company has an opening for a plant chemist. A chemical degree and approximately five years experience in control and production of portland cement are required. Salary open.

Box No. PQ-316-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

SUPERINTENDENT WANTED

Must have knowledge and experience in operation of pulverizing equipment. Four year job in Arizona. In first letter state experience, qualifications, expected earnings and references.

Box No. PQ-316-C, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

SUPERINTENDENT WANTED

For Crushed Stone Plant and Blacktop Plant. Write full information to

COUNTY LINE STONE CO., INC.
AKRON, N. Y.

MANAGER FOR AGGREGATE (CRUSHED LIMESTONE) PLANT

This is an outstanding opportunity with a new Eastern company that is expanding. Salary plus stock option for man who has

—a proven record of accomplishment in managing an aggregate plant.
—ability to produce profitable results through efficient operation.

We would prefer a college graduate but this is not a necessity. Age 30 to 55. This is a challenging position and a big opportunity awaits the man who can get things done and produce results.

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431 So. Dearborn St. Chicago 5, Illinois

SHOVELS, CRANES & ATTACHMENTS

Bucyrus-Erie Model 38-B, 1½ yd. Dragline with long and wide track, 11'6" wide, 7'5" long, 33" pads, 70' boom, pendant suspension unit, 79 extra counter weights. Powered by IHC UD 1091 Diesel engine. Total weight 109,360#. Replacement cost $60,915.00. Like new condition. 4 months of rental service is all this dragline has been used. $49,900.00 F.O.B. LOUISVILLE, KY.

Bucyrus-Erie Model 51-B, 2 yd. capacity Lifting Crane with 100' boom and 20' jib. Long and wide under carriage, 40 ton sheave block. Powered by Buda Model 6DCB Diesel engine. Crane less than 2 years old—has been in our rental fleet, saw very little service, like new condition. Replacement cost approximately $82,000.00. $69,000.00 F.O.B. LOUISVILLE, KY.

Bucyrus-Erie Model 22-B Heavy Duty Dragline, Clamshell, 60' boom pendant suspension, lifting crane. Long and wide tracks, extra counter weights. Powered by IHC UD-525 diesel engine. Replacement cost $34,400.00. $24,500.00 F.O.B. LOUISVILLE, KY.

Bucyrus-Erie Model 22-B, ¾ yd. capacity Basic Machine. Powered by IHC Model UD-525 Diesel engine. Less than 3 years old. Excellent condition. From our rental fleet. $19,100.00 F.O.B. LOUISVILLE, KY.

Bucyrus-Erie Model 22-B Heavy Duty Crane, Dragline and Clamshell 51-20 Combination, 30" treads. Powered by International Model UD-525 Diesel engine. Long and wide tracks. Like new condition. $24,500.00 F.O.B. ELIZABETHTOWN, KY.

Bucyrus-Erie Model 11-B Backhoe Attachment will fit 10-B Bucyrus-Erie also. #12950. $800.00 F.O.B. ELIZABETHTOWN, KY.

Lorain Model 40, ¾ yd. Shovel on crawlers. Powered by gasoline engine. #7912. $4,500.00 F.O.B. ELIZABETHTOWN, KY.

Lorain Model L-80, 1¾ yd. Shovel, crawler mounted. Powered by Cat Model D-13000 Diesel engine. Shovel in fair operating condition. $12,500.00 F.O.B. ELIZABETHTOWN, KY.

P&H Model 255 ¾ yd. Dragline with Waukesha gas engine. Condition very good. #10926. $6,500.00 F.O.B. EVANSVILLE, IND.

P&H Model 255-A ¾ yd. Shovel, crawler mounted. Powered by Caterpillar Model 315 Diesel engine. #5018. $14,500.00 F.O.B. ELIZABETHTOWN, KY.

Koehring Model 304, ¾ yd. Shovel on crawlers. Powered by International Model UD-14A Diesel engine. #8921. $5,500.00 F.O.B. ELIZABETHTOWN, KY.

Koehring Model 304 Shovel Front Attachment, ¾ yd. capacity. Like new condition. #398. $1,900.00 F.O.B. ELIZABETHTOWN, KY.

Insley Model ¾ yd. Backhoe Attachment. #12951. $1,200.00 F.O.B. ELIZABETHTOWN, KY.

Lorain Model TL-20 Dragline with 45' boom, Waukesha gas engine. Under carriage rebuilt. Good operating condition. #5970. $8,500.00 F.O.B. EVANSVILLE, IND.

Unit Model 514, ½ yd. Shovel with Chrysler Gas engine. #10921. $3,750.00 F.O.B. PADUCAH, KY.

Bucyrus-Erie Model 10-B, ⅜ cu. yd. Shovel, 1952 Model, Buda gas engine. Excellent condition. #12815. $7,500.00 F.O.B. EVANSVILLE, IND.

Write-Wire or Phone Jim Waddell

BRANDEIS MACHINERY & SUPPLY CO.

P. O. BOX 1705 LOUISVILLE 1, KY. MElrose 7-4741

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Bucket Elevators All Sizes Built to Order.
Belt Conveyors All Sizes Built to Order.
Largest Stock Reducers on East Coast.
Motors Up to 50 H.P.
Good Used Belt 18" to 48".
16" Used Rex Idlers.
18" Used Barber-Greene Idlers.
24" Used Jeffrey Idlers.
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New Universal Screens in stock.
Niagara 2½' x 12' Single Deck Screen.
Niagara 4' x 14' Single Deck Screen.
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Syntron F-4100 Feeder with controls.
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New England Jaw Crusher 14" x 28".
Farrel Lab. Jaw Crusher 6" x 2".
Acme Jaw Crusher 14 x 26" Steel Frame.
Iowa 25 Yd. Portable Crushing Plant.
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Heatherington Dryer, 6' x 32', 50 H.P.

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136 Coit St. Irvington, N. J.

Essex 3-8105

FOR SALE

One 30" x 36' Dryer for Sale
New Never Used with 10 H. P. Motor, 440 Volt, 3 Phase 5/16 shell

WARREN CLAAR

Phone Claysburg 139 Claysburg, R. D., Pa.

#50 Raymond Impact Mill—VERY FINE
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35 Ton Stdg. Ga. Gas Plymouth Locomotive
36"x30' Eagle Log Washer—LIKE NEW
10" Morris Slurry & 8" Dredge Pumps
4'x10' UNIVERSAL 2-Deck Shaker Screen
9"x10" Air Compressor—Motor Driven
2—150 HP Slow Speed Slip Ring Mtrs

H. & P., 6719 Etzel, St. Louis 30, Mo.

FOR SALE

¾ Yard Hayward Orange Peel—excellent condition. Has 4 arms opening to 80" maximum. Weighs 3920#—priced at $750.00 F.O.B. Elmira, N. Y.

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ELMIRA, NEW YORK

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ERECO
DIAMOND CORE DRILLING COMPANY
Thomasville Pennsylvania
E. E. Cooke, Proprietor
Telephone: YORK, PA. 7305 or 5881

We do
CONTRACT DRILLING
Anywhere
SPECIALIZING IN QUARRY BLAST HOLES USING
INGERSOLL-RAND DRILLMASTERS
Hole sizes from 4¾" through 6½"
NEW JERSEY DRILLING COMPANY
Box 251, Route 206, Netcong, N. J.
NEtcong 9-2250

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

E. Lee Heidenreich, Jr.
Consulting Engineers
75 Second St.
Newburgh, N. Y.
JO 1-1828 (Code 914)

Construction
Design
Operation
Plant Layout
Appraisals

BONDED QUALITY BARGAINS

BONDED® TROUGHING IDLER CONVEYOR BARGAINS

CONVEYOR PRICES INCLUDE BELTING

Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1136.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

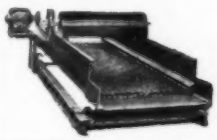
Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1425	$ 753	
14"	50'	2266	1182	$17.18
14"	85'	3445	1783	
16"	20'	1287	680	
16"	45'	2180	1140	
16"	60'	2715	1416	$18.40
16"	90'	3786	1969	
18"	25'	1507	813	
18"	45'	2261	1206	
18"	70'	3205	1696	$19.62
18"	85'	3771	1991	
18"	100'	4337	2285	
18"	130'	5469	2873	
20"	25'	1547	852	
20"	60'	2940	1579	
20"	75'	3536	1891	$20.78
20"	90'	4133	2202	
24"	25'	1622	916	
24"	45'	2479	1361	
24"	70'	3550	1916	$22.22
24"	100'	4835	2583	
24"	120'	5692	3026	
24"	150'	6977	3693	
30"	50'	2969	1649	
30"	70'	3948	2154	$25.25
30"	90'	4928	2659	
36"	25'	1854	1140	
36"	45'	2915	1711	$28.51
36"	60'	3711	2138	
36"	100'	5832	3278	

BONDED® HEAVY DUTY MOBILE CONVEYORS

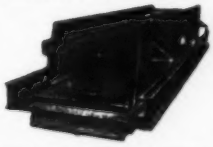
- FAST ECONOMICAL HANDLING OF BULK MATERIAL
- AVAILABLE WITH SCREEN AND FEEDER
- RUGGED 30" DEEP TRUSS FRAME
- HIGH TONNAGE AT LOW COST
- EQUIPPED WITH TOW HITCH

The economical solution to the need for a heavy duty conveyor that can be readily moved from one job-site to another. Available with mast or mastless type undercarriage and hydraulic powered mechanism. All standard conveyor accessories can be used. Lengths to 60 feet and belt widths through 30 inches. **Priced from $2365.00**

BONDED® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS



More than 7000 Mines and Quarries have modernized with Bonded Equipment



PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**

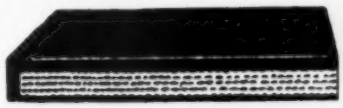
Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	956
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	996

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14', 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1510
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	2440
2410B	4'x10'	2	2400
3410B	4'x10'	3	2550
2412B	4'x12'	2	2590
3412B	4'x12'	3	2970
4412B	4'x12'	4	3165

TESTED CONVEYOR BELTING*

We pay freight on 200 pounds or over plus an additional 10% savings from sale price for full rolls 500 to 650 feet.



Major Brand: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile.

Heavy Duty 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stocks.

Width	Ply	List Price Per Foot	Sale Price Per Foot
14"	4	$3.78	$2.94
16"	4	4.24	3.09
18"	4	4.69	3.42
20"	4	5.17	3.95
24"	4	6.08	4.43
30"	4	7.47	5.42
36"	4	8.85	6.43

Major Bee Brand: 18# to 19# Average Friction Pull, 2400# to 3000# Average Cover Tensile. Skim coat between plies.

A high grade of heavy duty 4 and 5-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For handling stone, mineral ores, concrete, cement, coal, and other similar materials, both wet and dry. Belts have molded rubber edges.

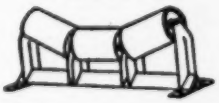
Width	Ply	List Price Per Foot	Sale Price Per Foot
14"	4	$4.48	$3.18
16"	4	5.04	3.80
18"	4	5.61	3.98
20"	4	6.14	4.54
24"	4	7.22	5.14
30"	4	8.87	6.31
36"	4	10.49	7.84
24"	5	8.47	6.07

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1263

BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



3-roll, 5" diameter Troughing Idlers for:

14" belt	$18.75	24" belt	$32.75
16" belt	20.50	30" belt	23.95
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.90	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 — **WRITE FOR FREE CATALOG AND PRICES** — **PHONE Evenings: AX. 1-2213**

110 BELLEVUE Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders & Bucket Elevators **COLUMBUS 7, OHIO**

USED MACKS, EUCLIDS AND DARTS FOR SALE, LEASE OR RENT

Model & Serial No.	Capacity	Location	Year Built
Euclid 40 TD 11558	22½ tons	Indianapolis, Ind.	1951
Euclid 49 FD 6129	15 tons	Hazleton, Pa.	1947
Euclid 49 FD 6395	15 tons	Hazleton, Pa.	1947
Euclid 49 FD 8984	Water Wagon	Indianapolis, Ind.	1947
Euclid 49 FD 7761	15 tons	Indianapolis, Ind.	1948
Euclid 49 FD 8178	15 tons	Indianapolis, Ind.	1948
Euclid 49 FD 6753	15 tons	Indianapolis, Ind.	1947
Euclid 49 FD 7471	15 tons	Indianapolis, Ind.	1948
Euclid 63 TDA 21201	22½ tons	Ogden, Utah	1957
Euclid 63 TDA 21709	22½ tons	Ogden, Utah	1957
Euclid 63 TDA 21708	22½ tons	Ogden, Utah	1957
Euclid 49 FD 10108	15 tons	Indianapolis, Ind.	1951
Euclid 23 FDT 4347	33 yd. Coal Hauler	Indianapolis, Ind.	1945
Euclid 23 FDT 4387	33 yd. Coal Hauler	Indianapolis, Ind.	1945
Euclid 20 TD 10583	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10591	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10830	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10837	22½ tons	Boise, Idaho	1950
Euclid 20 TD 10581	22½ tons	Boise, Idaho	1950
Euclid 32 TD 11475	22½ tons	Boise, Idaho	1951
Euclid 20 TD 10582	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10836	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10588	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10835	22½ tons	Coeur d'Alene, Idaho	1950
Euclid 20 TD 10589	22½ tons	Birmingham, Ala.	1950
Euclid 20 TD 10828	22½ tons	Birmingham, Ala.	1950
Euclid 20 TD 10831	22½ tons	Birmingham, Ala.	1950
Dart 10 SUG 57037	10 ton Underground	Worcester, Mass.	1957
Dart 10 SUG 57038	10 ton Underground	Worcester, Mass.	1957
Dart 10 SUG 57051	10 ton Underground	Worcester, Mass.	1957
Dart 10 SUG 57052	10 ton Underground	Worcester, Mass.	1957
Mack LRIS 1099D	15-ton	Providence, R. I.	1950
Mack LRIS 1159D	15-ton	Providence, R. I.	1950
Mack LRIS 1185D	15-ton	Providence, R. I.	1951
Mack LRIS 1186D	15-ton	Providence, R. I.	1951
Mack LRIS 1046D	15-ton	Indianapolis, Ind.	1949

2—Used 36 TD Boxes
3—Used FD Boxes

1—Northwest 80 D Combination Shovel, Dragline and Crane—Serial 18501. Located at Salt Lake City, Utah—1957 Machine

MESABA SERVICE & SUPPLY COMPANY
Hiway 169 East & Thirteenth Street
P. O. Box 121 HIBBING, MINNESOTA Telephone AMherst 3-6831

TITANIUM PLANT

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, ⅞" shell.
1—Rennenberg 6' x 60' Rotary Kiln.
2—Abbe 5' x 16' Ball Mills.
3—Bucket Elevators; 125', 32', 30'.
2—Aurora 24" Vert. Cent. Pumps, 200 HP motors, 5000 gpm, 125' head.
1—Bemis Automatic Bag Packer, Sewing Machine, Conveyor and Flattener.
1—Deep Well Pump, 75 HP Vert. Motor.
1—8' x 8' Oliver Precoat Filter.
6—Dorr Thickener Mechanisms, 16'.
18—Steel Buildings 20' to 80' wide, x 60' to 140' long.
2—20 ton Overhead Cranes, 30' & 35' spans.
8—Redler Conveyors; 30', 35', 40', 75', 80' and 125' long.
200'—Screw Conveyor, 9" and 12".

SEND FOR CIRCULAR

Representative on Premises

Broening Highway Baltimore, Md.
Tel: Medford 3-2911

BRILL EQUIPMENT COMPANY
35-59 Jabez Street
Newark 5, N. J.
Market 3-7420

FOR SALE

2 Loomis Well Drills—Electric
2 Loomis Well Drills—Gasoline
1 Armstrong Bit Sharpener, Mdl. #6
1 Telsmith Settling Tank, #5
1 Telsmith Settling Tank, #6
1 Telsmith Settling Tank, #7
1 Western Side Dump Car, 16 Yd., Std. Ga.
1 Orton Steam Crane, 25 Ton, 2½ Yd.
1 Vulcan Steam Locomotive—38 Ton
1 Vulcan Steam Locomotive—40 Ton
1 Baldwin Steam Locomotive, 50 Ton & Parts
1 Buffalo Exhaust Fan, #24
1 Buffalo Exhaust Fan, #30
1 Gates Gyratory Crusher, #7½K
1 McLanahan Crusher, 30" x 42" style C627
1 Link Belt HD Picking Table, 4' x 20'
1 Wisconsin Air Cooled Gas Engine, Mdl. VP-4
1 Flinck's Lime Spreader, 7 Ft.
1 Hoist Chain, Hand Forged, 1⅛" x 135'

NEW PARTS FOR 36" McCULLY CRUSHER

1 Main Shaft and Mantle Assembly
1 Split Adjusting Nut
1 Steel Baffle Ring
1 Cast Iron Main Shaft Sleeve

ELECTRIC MOTORS

2 5 HP, Allis-Chalmers, SR, 3/60/440/600
2 30 HP, AC, SR, TEFC, 3/60/440/1200
1 50 HP, Economy Westinghouse, 3/60/440/900
1 150 HP, AC, SC, 3/60/440/1200
1 100 HP, Burk, 3/25/440/1500
1 9 HP, G.E., Direct Current, 230V, 900 RPM

MOTOR-GENERATOR SET

1 1000 Amp, 250V, Allis-Chalmers Generator Direct Connected to 300 HP AC Synchronous Motor 3/60/440/600

THE FRANCE STONE COMPANY
1800 Toledo Trust Bldg., Toledo 4, Ohio
Cherry 1-4101

WIRE US COLLECT!

ROTARY KILN
6 x 7 x 100'. Heavy shell. Complete with fire heads, motor and drive.
Priced Low.
Must Move.
Wire or phone collect—GA 1-1380
ME MACHINERY AND EQUIPMENT CO.
123 Townsend St. · San Francisco 7, Calif.

FOR SALE

Universal Wobbler Feeder, 60" wide, 13 bar, 12½" pitch, complete with drives, electric powered, lubrication system, variable speed transmission, good condition. Original cost over $50,000.00. Will take $15,000.00 F.O.B. location near Chicago, Illinois.

AL. FISHEL EQUIP. SALES CO., Ph. JE 5-4482
1318 No. Vandeventer Ave., St. Louis 13, Mo.

DEPENDABLE USED MACHINES

SPECIAL: Lorain 20 ton truck crane powered by Waukesha 6MZA gas. eng., w/60' boom

Hopto Scrap Grapple	5x16 Telsmith d.d. screen	360 Hopto on GMC tandem truck
4-T Ditcher	5x14 Telsmith d.d. screen	Shovel front for Lorain 77B
P&H 150 ½ yd. backhoe	4x10 Telsmith d.d. screen	Amer. 50B 3 drum hoist w/slewer
Unit 614 ½ yd. backhoe	Lima 34 Paymaster backhoe	105TMC Hopto for mounting on HD5
Unit 514 ½ yd. backhoe	¾ yd. Trojan LC-100 backhoe	Terratrac 500 w/backhoe & trailer

This equipment rebuilt in our modern plant by expert mechanics. Come see it!

10004 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Illinois

For Best Results
Advertise in
PIT and QUARRY'S
Broadcast Section
Write for rates

FOR SALE OR RENT

2½ Yd. Manitowoc #3900 Crane-Dragline. New 1955. 100' Boom.
1½ Yd. Manitowoc #2000B Crane-Backhoe. New 1956.
75 Ton Whitcomb Diesel Elec. Loco. 500 HP Cat. New 1951.
44 Ton Gen. Elec. Diesel Elec. Loco.
40/50 Ton American Diesel Loco. Crane
25 Ton Ind. BH. Diesel Loco. Crane
25 Ton Gen. Elec. Diesel Elec. Loco.
6 Yd. Bucyrus-Erie Elec. Shovel. 1955.
90 HP Lidgerwood 2D Diesel Hoist.

WHISLER EQUIPMENT CO.
1905 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

FOR SALE

3—**29T BUCYRUS-ERIE** Wire Line Blast Hole Drills.
5—**42T BUCYRUS-ERIE** Wire Line Blast Hole Drills.
1—**TRAYLOR** Model TZ Gyratory Crusher.
1—**COVERED BARGE**—suitable for exhibition work, carrying cement, a work or tool boat. Also could be used as a boat club or floating office.
2—Cast Steel 96 Tooth, 13¼" D.P., 5" Face, 54.86 P.D., Hub 6" Faced. Bored for 5-15/16", K.S. 15/32 x 15/16. Suitable for use in a tandem drive on a conveyor.
1—**INTERNATIONAL-HARVESTER MODEL** L-210-1952 Dump Truck (six wheel); with reconditioned motor installed.
Several **ELECTRIC MOTORS** ranging in size from 1 H.P. to 40 H.P.
1—**A.C. ONAN 15 KVA GENERATOR SET,** Diesel Powered, 110/220 V., single phase, 3-wire, 60 cycle, gasoline starting panel, ammeter, etc. In excellent condition.

NEW YORK TRAP ROCK CORPORATION
162 OLD MILL ROAD
WEST NYACK, NEW YORK
Telephone - ELmwood 8-4500

LIQUIDATING BRIQUETTE PLANTS

3—Ruggles-Coles Class #XA-18, double shell indirect-direct heat rotary dryers, 104" x 70' x ⅝" shell.
2—Komarek-Greaves, briquetting presses, 75 HP, 25 tons per hour.
4—Komarek-Greaves vertical Fluxers.
4—K-G Horiz. Fluxers 41" dia., 50 HP.
4—K-G Pug Mills, 30" dia. x 14'4".
3—Tyler Screens, 4' x 6'.
2—43" wide cooling conveyors.
6—Robinson Sawtooth Crushers.
2—Pa. Crusher #C-3-30 hammermills.
20—Welded Steel bins, cone bottom, from 15,000 gallon to 90,000 gallon.
1—Keeler Boiler 200 HP, 160 PSI.
8—Bucket elevators, 62' and 90' c-c.

PERRY EQUIPMENT Corp.
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Phone: POplar 3-3505

HEAT & POWER CO., Inc.
60 E. 42nd STREET
NEW YORK 17, N. Y.
Phone: MUrray Hill 7-5280

FOR SALE

1 Barber Greene bucket loader, Model 543, pneumatic tires, heavy duty, capacity of 3 yds. per min. Excellent condition. Surplus.

Mr. Joseph Nagy
Columbia Concrete Pds., Inc.
2401 Consaul St. Toledo, Ohio

BEST BELT BUYS

Heavy duty, 2500-3000# cover tensile, 16-19# friction pull. Brand new, factory fresh.

		LIST	SELL
14" 4 ply 28 oz.	1/8"x1/32"	$4.48	$2.60
16"	1/8"x1/32"	$5.06	$2.93
18"	1/8"x1/32"	$5.61	$3.26
18"	1/8"x1/16"	$5.92	$3.44
20"	1/8"x1/32"	$6.14	$3.56
24"	1/8"x1/32"	$7.22	$4.18
24" 5 ply 28 oz.	1/8"x1/16"	$8.78	$5.09
30" 4 ply 32 oz.	1/8"x1/16"	$9.92	$5.75

Many other sizes. Samples on request. Distributor inquiries invited.

PALTECH CO.
New Canaan, Conn. — WO 6-4126

NEW RAIL

20# — 30# — 40#
IN STOCK

LEFTON INDUSTRIAL CORP.
GENERAL OFFICE: 212 Victor St.
St. Louis 4, Mo.

STRIPPING EQUIPMENT

FOR SALE IN MADISONVILLE, KY.

BARGAINS—4—200W Bucyrus-Erie Walking Draglines, 125 ft. booms, Elec. Swing, 6-8 c.y. rating. Terms; arranged.

1—620 W Page Walking Dragline, 6-7 c.y. rating
1—1201 Lima 3½ yd. shovel
1—1005 Koehring 2½ yd. shovel
1—362 Marion 2½ yd. shovel
1—111M Marion 3½ yd. shovel
1—93M Marion 3¼ yd. Dragline
1—¾ yd. Loraine Shovel
1—20 yd. Garwood Scraper
2—10 ton Gallon rollers
2—D-7 Caterpillars (like new)
1—Hardsog Horizontal drill
1—Barber Greene 18" loader
2—Haise loaders Model 75W
6—Wagon Drills
1—¾ yd. Dragline bucket
1—6 yd. Dragline bucket
1—5 ton crane frame
1—¾ yd. Koehring shovel front
2—Jack Hammers

ALL TYPES OF PUMPS, COMPRESSORS CRUSHERS AND DRILLS
MINE EQUIPMENT AND SUPPLY CO.
(Mesco)
149 Dempsey St. Taylor 1-2644 Madisonville, Ky.
WE BUY, SELL OR TRADE USED EQUIPMENT
H. D. MOUSER TA 1-4864 W. E. BEARD TA 1-7121

Acetylene Generators

Just received 22 Ed., 600 cu. ft. per hour acetylene generators, Pulsator type A, model 300A, 300 carbide capacity. These are new in the crate generators. They are mfd. by Sight Feed Generator Co., West Alexandria, Ohio. These cost $2,300.00.

Selling Price - $650.00 ea.

F.O.B. Jacksonville, Florida.

Box No. PQ-320-C, c/o Pit and Quarry Publications
431 So. Dearborn St.
Chicago 5, Illinois

For Sale—STONE CUTTER—Heavy Duty. Will cut Quartzite up to ten inches thick and 50 inches wide. Good as new. Hydraulic operated. Union Mining Co., 2306 First Natl. Bank Bldg., Pgh. 22, Pa.

SPECIAL

2—American heavy duty, band type friction drag-scraper hoists, Cap. rear drum 5000# @ 600 RPM. Front drum 12,000#. Inhaul speed 250 FPM. Excellent condition.

SPECIAL PRICE (no motor) — $3,750.00
(125 HP Elec. Motor) — $6,500.00

ECA
EQUIPMENT CORPORATION OF AMERICA
Box 608 Clifton Heights, Pa.
Box 43, Coraopolis, Pa. Sub. of Pitts.)
327 S. LaSalle St., Chicago 4, Ill.

FOR SALE
LOCOMOTIVES

2—45 ton G.E. Diesel Electric with Cummins Engines
1—65 ton Porter Diesel Electric with Cummins Engines
1—30 ton Plymouth diesel mechanical with GMC Engine.

Excellent Condition

Phone—Wire—Write

HYMAN-MICHAELS COMPANY
108 N. State Street Chicago 2, Ill.
'Phone: DEarborn 2-5422

ELECTRICAL POWER EQUIPMENT

REBUILT SLIP RING MOTORS
3 ph 60 cy 220 or 440 volts

HP	RPM	MAKE	TYPE
1500	514*	Al.-Ch.	Mill Type
1300	360*	Al.-Ch.	Mill Type
900	160*	Al.-Ch.	Mill Type
600	1800*	Gen. Elec.	M-6345S, Dppf. New
500	1200	Gen. Elec.	M-6345Z, Dppf.
400	720	Gen. Elec.	MT-57 3Y
350	900*	West.	CW
350	1800*	Al.-Ch.	ARYW (2)
300	1800	Cr.-Wh.	SR
300	600	Gen. Elec.	I-M-17A
300	600*	F.-Morse	HV-H300D, BB
300	450	Gen. Elec.	I-M, 2 or 3 brg.
250	720*	Gen. Elec.	I-M, 17A

*2200 volts or higher.

SQUIRREL CAGE MOTORS
3 ph. 60 cy. 220 or 440 volts
(*2200 volts or higher)

HP	RPM	MAKE	TYPE
1250	3600*	Al.-Ch.	ANX
800	1800	West.	CS-34C
600	600*	West.	CS-44-C15 Dppf. (2)
500	1200	Gen. Elec.	I.K.
400	1800*	L. Allis.	BB. Sppf.
400	1800	West.	BB. Dppf.
400	1200	Gen. Elec.	K TP-585
350	3600	Cr.-Wh.	SC. Dppf.
300	1200	Gen. Elec.	KT-559. Dppf.
300	600*	West.	CS-39A
300	600*	West.	CS-1002
300	400	Elliott	Design 40Y03
250	1800	Gen. Elec.	KT-559
250	1800	West.	CS-8120S, TEFC, Xpf.

SYNCHRONOUS
3 ph 60 cy A.C.

HP	RPM	MAKE	REMARKS	VOLTS
900	1200	Gen. Elec.	TS. 1.0 PF	2300
300	357	Ideal	SMM, .8 PF	4000/2300
275	450	Gen. Elec.	ATI. 1.0 PF	2300
250	1200	Al.-Ch.	1.0 PF	440(4)
225	300	Gen. Elec.	TS-6244D, 1.0 PF	220
225	360	Elec. Machy.	1.0 PF	440
225	720	Al.-Ch.	6 PF	2200/440
210	1200	Gen. Elec.	ATB-32, bus. exc.	400
200	1800	Gen. Elec.	TS-7559, dir. con. exc.	440
190	720	Elec. Machy.	1.0 PF	440
150	300	West.	HR. 1.0 PF	2200
150	1200	Al.-Ch.	1.0 PF	440
150	1200	Elec. Machy.	.8 PF	2200/440
125	277	Gen. Elec.	TS-6214, 1.0 PF	2300(3)

M. G. SETS

KW	Make	Motor A.C.V.	Generator D.C.V.
1000	West.	4160	250
600	G.E. (3 unit)	2300/440 syn.	125/250
500	West.	2300/440 syn.	125/250
400	Al.-Ch.	2300/440 syn.	125/250
300	West.	2300/480 syn.	250
200	Reliance	2300/440 syn. TS	500
200	Gen. Elec.	2300/440 syn. TS	250/275
200	Ridgeway	2300 syn.	250
150	Al.-Ch.	220/440/220	250
150	West.	2300/440/220 syn.	125/250
125	West.	2400/480 syn.	250
125	G.E.	2400/480 syn.	250
100	West.	2300/4000 syn.	250/275
100	G.E.	2300/4160 syn.	250

D. C. MOTORS
37½/75 575/1150 Reliance CD-1342Y(450V.)
230 Volts

HP	RPM	MAKE	TYPE
300	575/1150	West.	CB-509-4
200	700	West.	SK-201
175	700	G.E.	FLC-11
150	380/1000	G.E.	MCF
150	1150	G.E.	RC-37 (4)
150	720	G.E.	RC-39A
150	400	West.	SK-201
125	670	G.E.	CD-1343,dppf.
100	2500	G.E.	RC-34
100	400/800	G.E.	MPC-6
100	575/1150	G.E.	CD-147
100	1150	West.	SK-163
100	750	G.E.	CD-135
100	575	G.E.	CD-147

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3—1250 KVA Allis Chalmers Class OA Oil filled Sgl ph 60 cy 34,400 Volt primary, 480 volt secondary with taps, manufactured 1955.

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Our 50th Year 1910 to 1960

Phone CAnal 6-2900

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1329 W. CERMAK ROAD • CHICAGO 8, ILL.

USED EQUIPMENT

We have the following used equipment in our lot for immediate sale as follows:

1—Littleford 1200-gallon Asphalt Distributor mounted on frame, for mounting on truck with walker 99, 10-foot spray bar and 2 extra 4-foot spray bars, equipped with 8 cylinder Ford engine and Delco Remy Generator $1950.00

1—#879 Barber-Greene Asphalt Finisher, with 10' base width LeRoi water cooled engine, Model 201P7 4-cylinder, with Bosch magneto Delco Remy starter, Zenith carburetor, & Delco generator, extra equipment consists of 2 1' screed extensions, 2-cut-off plates, 2-slide plates, 1—18" screed plate extension & 2 Tamper bar extensions $7500.00

1—#879A Asphalt Finisher on 10" crawlers, 10' to 12' width, with 2 1' screed extensions, LeRoi D-201 engine, with Fairbanks Morse magneto, with Delco Remy starter, with Zenith carburetor, with Delco Remy Generator $12,000.00

1—10-14 Ton Galion Tandem Roller with electric lights and electric starter powered with Continental 6 cyl. gasoline engine, Spec. #633, with distributor, Marvel Schebler and Delco Generator $5500.00

1—Model LD8A-2203 Scoopmobile, 3½ cu. yd., power steering, mounted on 4 18.00x25 20-ply pneumatic tired wheels, with air brakes, power shift transmission, 4 speeds forward & reverse, 4-8-16-25 miles per hour, with selector for 2 or 4 wheel drive, equipped with Cummins Diesel 175 H.P. engine, model or type J8-IS-600 with Delco Remy 12-volt starter and generator complete with fenders and 4 lights—2 front & 2 rear, used only 1,231 hours $20,500.00

1—Kwik-Mix Hi-Lifter Fork Truck, with 22'6", telescoping 3 pc. hydraulically operated mast 48" long forks, mounted on 4 wheel drive tractor, with 4—14.00x24 pneumatic tires, Allison Torquematic Transmission, power brakes and power steering & Continental F244-6 cyl. 75 H.P. Q2200 RPM, water cooled gasoline engine, 12 volt starting & electric system $13,318.50

1—500 Gal. Roscoe Maint Unit mounted on trailer type chassis, on dual pneumatic tired wheels, size 750x20, with spray bar, & 4 cyl. 16 H.P. VE4 Wisc. air cooled engine with clutch reduction, with Fairbanks Morse magneto, & Zenith Carburetor $800.00

1—305-1A 15 ton ¾ yd. Crane with type B counterweight, tagline, fairlead, on 132'x99½" crawlers with 30" shoes, powered with GM Diesel engine Model 371, 3 cyl., with 35' boom, with extra 10' & 15' boom, with clutch throw out boom limit stop, telescopic boom stop, cab bracket, & 15 ton single sheave hook block $24,000.00

1—Blaw-Knox Finishing Machine, Model PF90, Serial No. 58-561-6194, 6 cylinder Hercules Engine 71 H.P. Machine is three years old and has had less than 100,000 tons of material processed through it.

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ALLIED CONSTRUCTION EQUIPMENT COMPANY

4015 Forest Park Avenue — **St. Louis 8, Missouri**

Telephone: FRanklin 1-1818 and 1-7132

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DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B.E. Elec. Drag, 215', 12 yd.
450-W B.E. Diesel Drag, 165' w/extra 10, 12, 13 and 14 yd. buckets.
9-W B.E. Elec. Drag, 165', 10 yd.
9-W B.E. Diesel Drag, 165', 12 yd.
7-W B.E. Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 13 yd.
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625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W B.E. Diesel Drag, 125', 6 yd.
2400 Lima Elec. Drag, 130', 6 yd.
2400 Lima Diesel Drag, 130', 6 yd.
5-W B.E. Diesel Drag, 100', 6 yd.
88-B B.E. Comb. Shovel/Drag, w/100' boom.
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111-M Marion Drag, 100', 4 yd.
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170-B B.E. 6½ yd. Elec. Shovel.
4161 Marion 6 yd. Elec. Shovel.
2400 Lima 4½ and 5½ yd. H.L. Shovels.
120-B B.E. 4 yd. Elec. Shovel.
4500 Manitowoc 5 yd. H.L. Shovel.
1201 Lima 3½ yd. Standard Shovel.
111-M Marion Standard & H.L. Shovels.
3500 Manitowoc Standard & H.L. Shovels.
54-B B.E. Standard & H.L. Shovels.
Model T-650 REICHdrill Truck Mtd. Rotary and Down-The-Hole.
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1—4¼' SYMONS STD. CONE CRUSHER COMPLETE WITH "V" BELT PULLEY AND COARSE BOWL. NEW MARCH 1959. IN EXCELLENT CONDITION. SERIAL #40651.

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Telsmith Jaw Crusher 25" x 36"
Telsmith 13-B Crusher
Telsmith Super Scrubber
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1—4' x 8' Model BG double deck Simplicity screen
1—4' x 8' Model BG triple deck Simplicity screen
1—4' dia. x 8' Trommel scrubber
4—23 c.y. Bins with gates
1—6' x 30' McLanahan-Stone double log washer
1—Model 25 Northwest dragline Serial #11890 G.M. power

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Unit	1020	Used ¾ yd. Trench Hoe, gas power, priced under market.
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Schield Bantam	M-49	Used Lift Crane, 40' boom, Ind. boom hoist; on GMC 6x6 Crane Carrier, outriggers.

MISCELLANEOUS

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PUG MILL 30" x 4½' Chambers
SCREEN 5' x 7' Rotex Sifter
SEPARATOR Dings Cross-belt with electromagnet and Rectifier
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Cedarapids Jr. tandem crushing plant, 1036 jaw.
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Cedarapids 1216 twin jaw crusher.
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18", 24", 30", 36" conveyors & belting.

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1—Caterpillar D-8 with Heil scraper.
1—Caterpillar D-7 with hydraulic angledozer.
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Used Austin-Western Gyratory Crusher Model 103
Capacity 10 to 20 tons per hour
THE UNION SAND & SUPPLY CORPORATION
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ROD, Marcy 7' x 15', 4" Liners, 300 HP
CONICAL, Hardinge 10' x 48" ball
CONICAL, Hardinge 4' x 16" ball
CONICAL, Hardinge 7' x 36" pebble
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PEBBLE, Allis-Ch. 6' x 18'

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GYRATORY, Allis #322, 3", 30 HP
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JAW BUCHANAN 13" x 24", 50 HP
JAW, 18" x 9", 20" x 6', 36" x 15"
ROLLER, Raymond 66", 6-roll, 200 HP
PULV., B & W Type E-32, 75 HP
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POplar 3-3505

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9—Ingersoll-Rand, 3000', 2200' & 1300'

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25-ton Industrial Brownhoist with D13000 Cat. diesel & 60 ft. boom

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7—25 ton, 4—45 ton, 1—65 ton, 1—80 ton, 2—100 ton General Electric
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300—1½, 3, 5, 16 & 20 yds. cap.

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96' boom, 40' mast, 50' S. legs, 39'10" sills, 16' bull wheel

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4' x 5' Miners Foundry
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7' x 15' Marcy Grate Discharge 300 HP motor

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4'6" x 16" 6' x 36", 8' x 36", and 10' x 48"

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42" x 36" Jeffrey Type B-2, with many spares
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3XE Gruendler 30" x 48"
8XT-14 Pennsylvania 400 TPH

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2" x 6" Sturtevant Lab. with motor & stand
10" x 16" Pioneer, gronze bearings NEW
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24" x 16" Cedar Rapids Double Roll
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42" x 16" Allis Chalmers Double Roll

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No. 19 Kennedy Van Saun
No. 122 Allis Chalmers Hydrocone
No. 28 Telsmith Intercone
2' Symons Standard Cone
No. 37½ Kennedy Van Saun

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12" Kennedy Van Saun
16" Allis Chalmers Superior McCully
20" Allis Chalmers Superior McCully (2) new 1948
25B Telsmith Primary Breaker
No. 11 McCully

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No. 61E Austin Western, 10" x 24" Jaw, 3' x 10' Screen, and electric motors
101 Austin Western 10" x 36" Jaw, 30" x 18" Rolls, 3 deck screen, and Murphy Diesel Engine

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4' x 8' & 5' x 10' Symons Rod Deck
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12'6" Link Belt Dewatering Rotoscope UNUSED
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5' x 30' Ruggles Cole Model XA-8
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8' x 60' reconditioned, ½ welded shell
3—10' x 78'—⅝" shell

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9' x 160' Allis Chalmers with burner
6' x 72' ⅝" Shell, gear train drive

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DOZER TRANS, CASES & ROLLER FRAMES

NO CRACKS - NO WELDS

D-2, D-4, D-7, RD-8, D-8 (2U)
TD-8, TD-9, TD-14
Model M, HD-7, HD-10, HD-14

Gaston I. Kimerling Co.
3319 5th Ave., No. - Birmingham, Ala.

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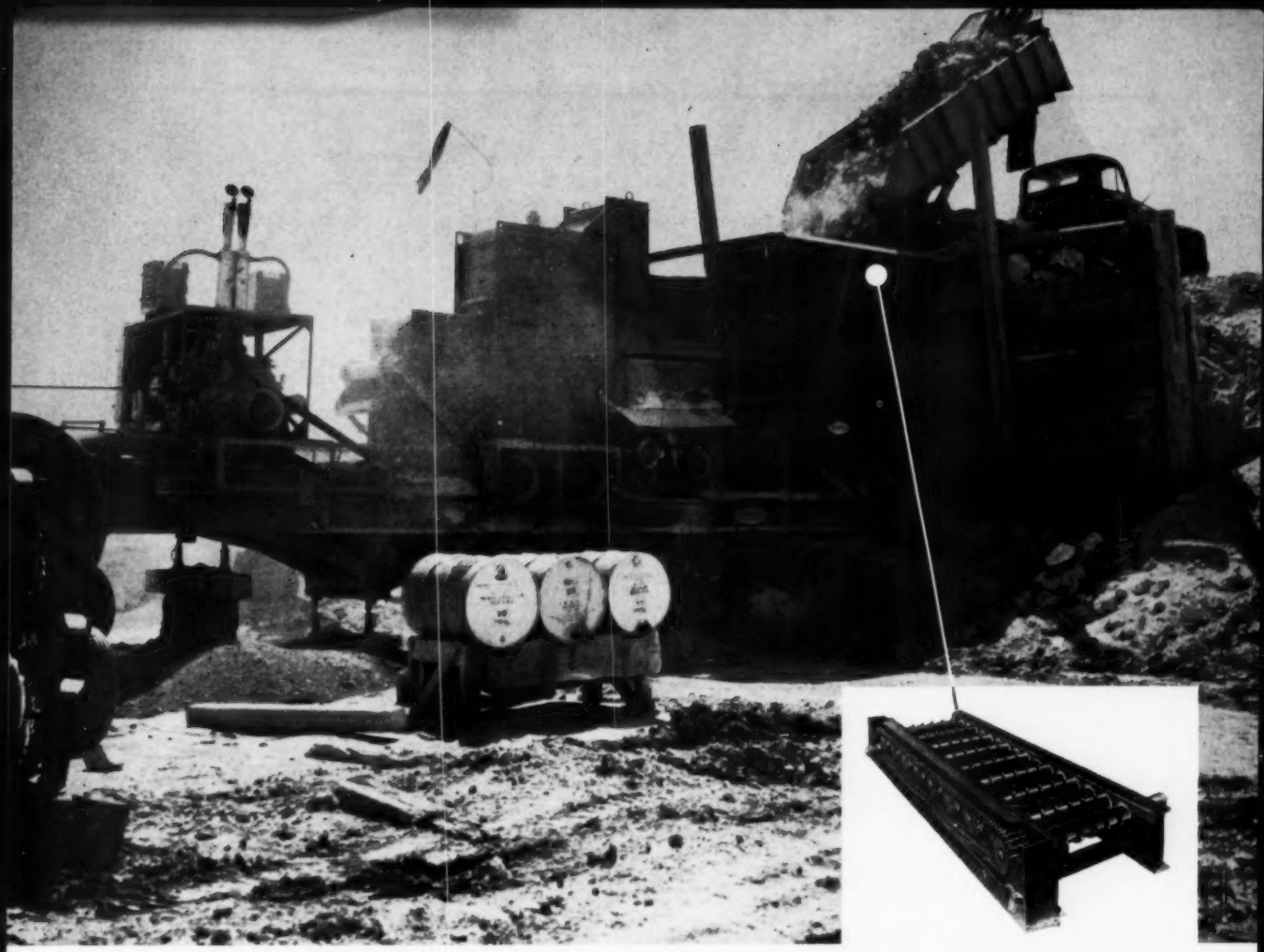

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PIT and QUARRY on your desk is like a full-time consultant on your staff

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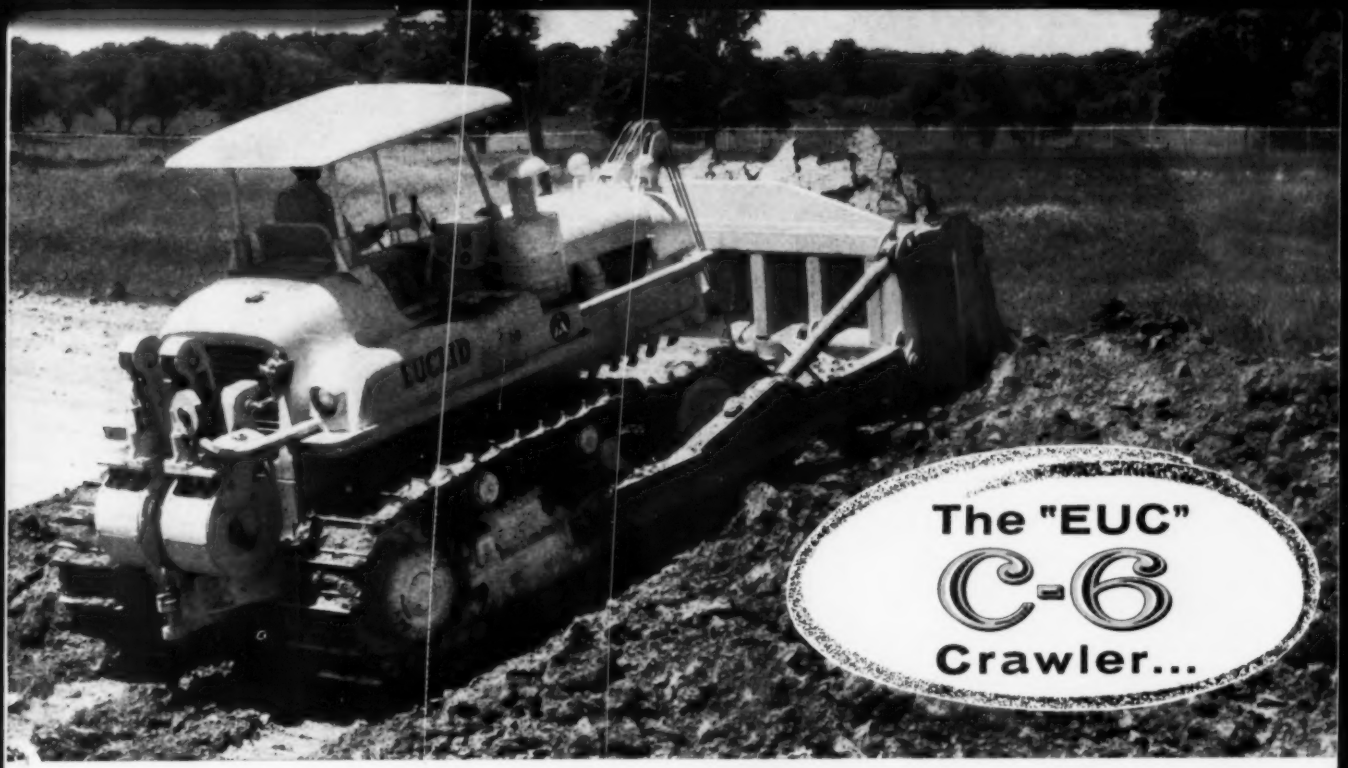


a brand new 5 year old!

Here are just a few of the many features that put this new C-6 "Euc" years ahead of competitive crawlers:

Proven Torqmatic Drive . . . performance tested and proved in thousands of Euclid earth-movers on the toughest jobs.

Full Power Shift . . . no master clutch . . . easy operation and "fast as a fox" maneuverability that cuts work cycle time.

Fast, Positive Response . . . common steering and braking control, plus Torqmatic Drive for smooth operation on all tractor work.

Better Track Alignment . . . track roller frames are pivot mounted ahead of final drives . . . advanced design of front equalizer bar maintains positive alignment.

Low Maintenance Costs . . . easy accessibility of major components . . . no adjustment of steering clutches and brakes required . . . fewer lube points . . . dry type air cleaner . . . 7 track rollers . . . no tractor weight on final drives . . . recoil system eliminates mechanical springs.

No other Euclid product has ever had the thorough testing — both on proving grounds and on actual jobs — that the C-6 tractor has undergone during the last 5 years. All of the product refinements and improvements resulting from this exhaustive test program, plus Euclid's really new concept of crawler design, make C-6 performance a new standard for comparison in the 200 h.p. tractor class.

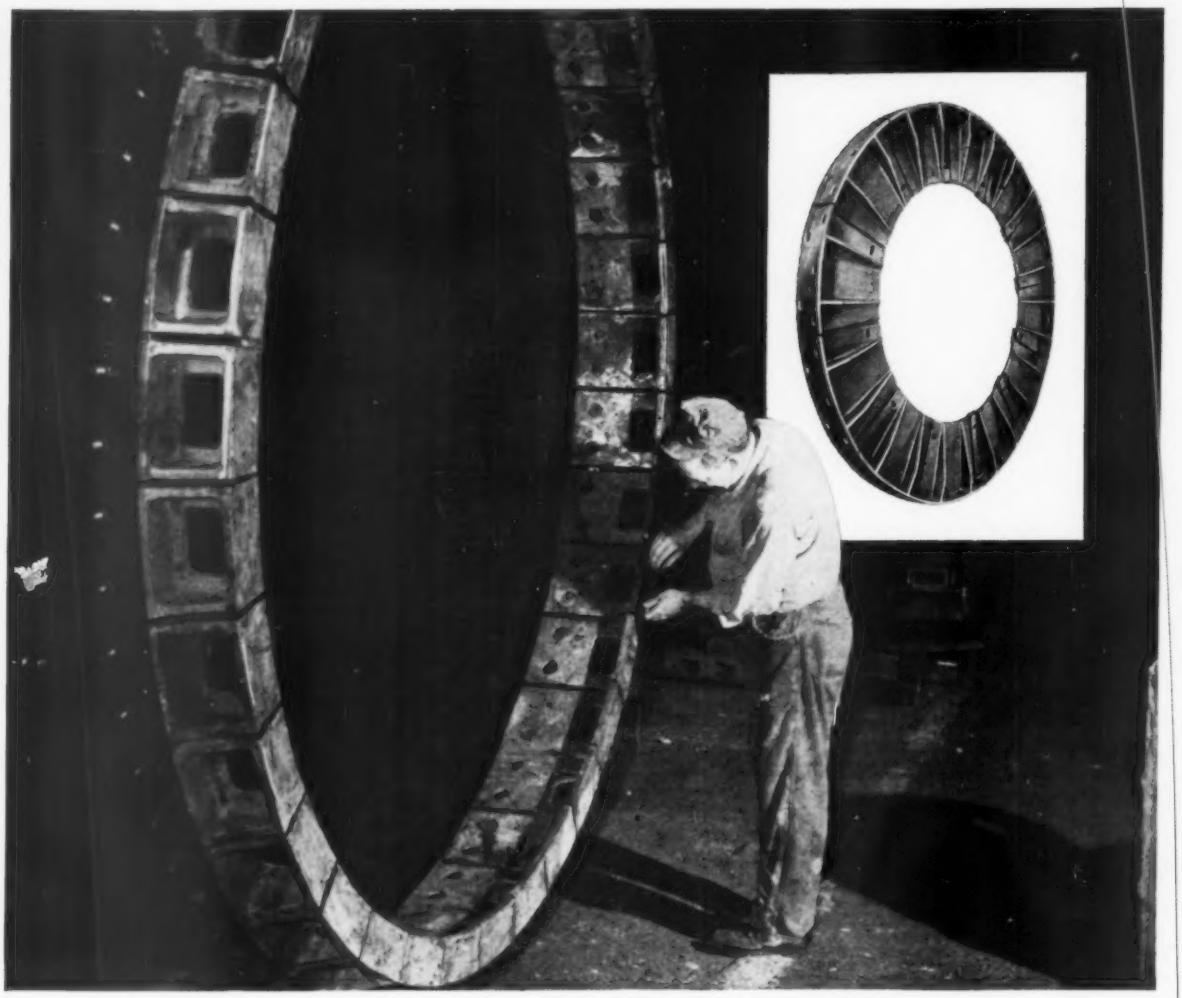
Have your Euclid dealer give you the facts and figures on the C-6 . . . compare performance as well as specs with any tractor in its class and you'll see what this new standard of tractor versatility can mean to you in better production and return on investment.

EUCLID Division of General Motors, Cleveland 17, Ohio

GM GENERAL MOTORS EUCLID

EUCLID EQUIPMENT

FOR MOVING EARTH, ROCK, COAL AND ORE



IN CEMENT, LIME, AND DOLOMITE PLANTS...

B&W Nose and Tail-Ring Castings Demonstrate Longer Continuous Service

Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

Light and strong B&W Alloy Castings have improved kiln performance in most installations. Made of heat-resisting Grade HH alloy, nose ring castings eliminate belling out of the kiln shell, assuring longer brick life and longer continuous operation of the kiln. By protecting the end of the kiln shell from direct flame, the nose ring castings prevent "feathering-down" of the shell because of oxidation. Their design eliminates cracking and warping, experienced with large size castings.

Small size and light weight make B&W Castings easy and inexpensive to install. The protecting flange on the nose ring castings permits the use of low-alloy steel bolts for fastening.

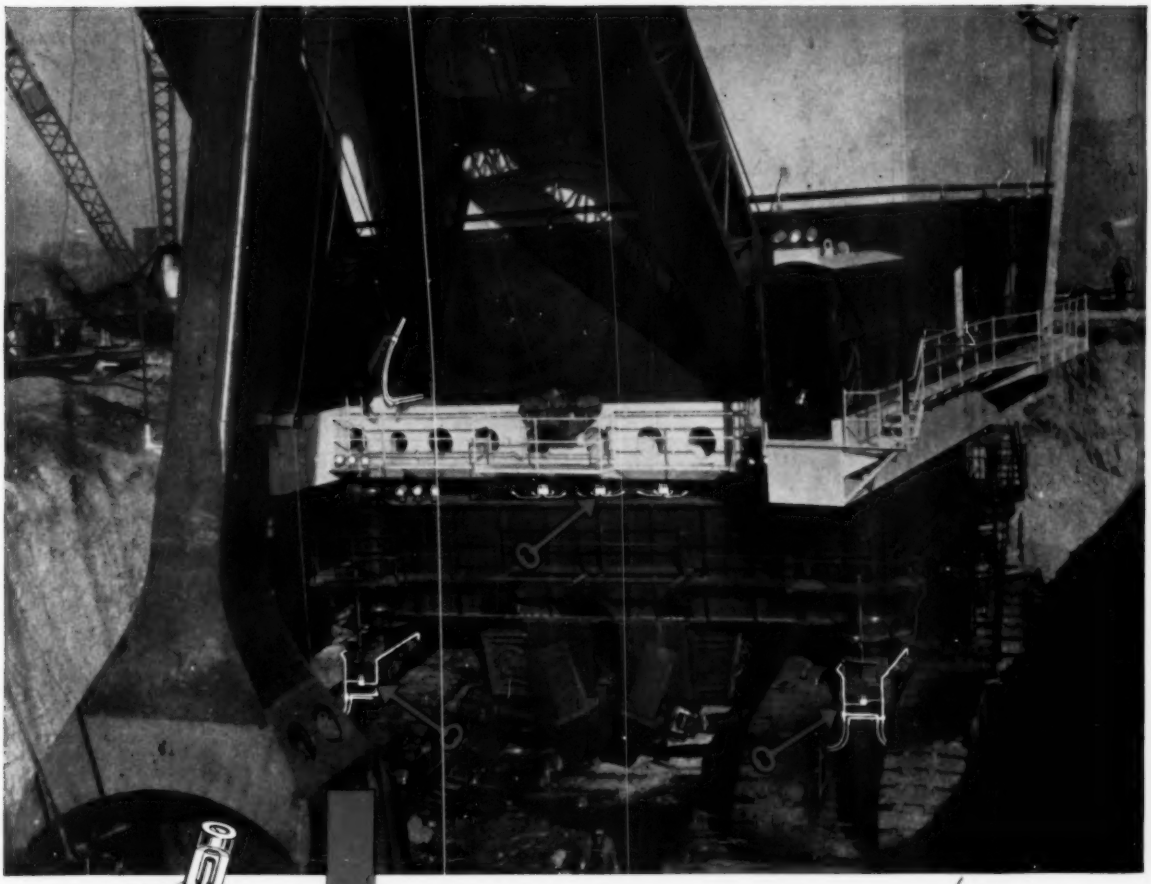
Spare part inventory may be kept low because the same nose ring castings may be used on kilns varying up to 4 feet in diameter, depending upon size. Write for Bulletin S-17. The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

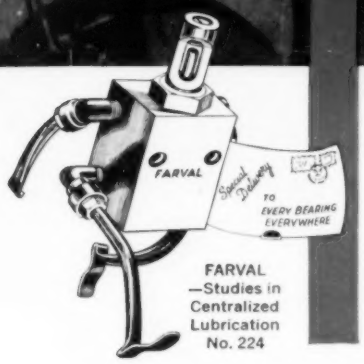
B&W

THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

S-467





FARVAL
—Studies in
Centralized
Lubrication
No. 224

Farval handles lubrication requirements for shovel bearings under 6,000,000 pound load

On this Marion #5760 shovel in the Midland Colleries near Victoria, Illinois, some 6,000,000 pounds rest on eight crawlers. The constant, positive lubrication required at the shovel's 336 undercarriage points is provided by a Farval air-operated system.

Another Farval system serves 115 roller circle bearings and 12 center pin thrust points through a system which can be disconnected as the points rotate.

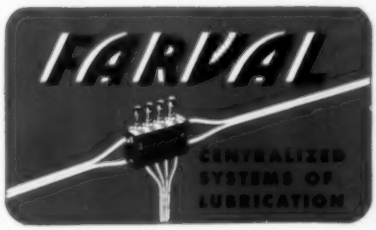
A critical group of 33 points which move in a 165° arc and 58 other points on the huge shovel are similarly protected by modern Farval lubrication systems.

Where load pressures are high, where flexibility is required, and where lubrication without downtime is desired, Farval systems are the answer. Write today for revised Bulletin 26-S,

Farval Division • Eaton Manufacturing Company
3280 East 80th Street • Cleveland 4, Ohio

KEYS TO ADEQUATE LUBRICATION

Wherever you see the sign of Farval—familiar valve manifolds, dual lubricant lines and central pumping station—you know a machine is being properly lubricated.



Enter Cover 3 on card, page 173

"It wasn't there last year!"

This is the new 300,000 sq. ft. addition to Kraft Bag Corporation's converting plant at St. Marys, Georgia, scheduled to go "on stream" in February.

Here, in one giant integrated operation, logs from our own forest lands are turned into pulp, then into paper, and finally into heavy duty multiwall shipping sacks, using the most modern machinery and equipment the industry affords.

This expansion of our facilities is one more step in our constant efforts to provide our customers with the best in quality and service.

We invite your inquiries.

Paper Mill at St. Marys, Ga.

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.

Daily News Building, Chicago 6, Ill.

Enter Cover 4 on card, page 173